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A REVISION OF *PANICUM*  
SUBGENUS *PHANOPYRUM*  
SECTION *STOLONIFERA*  
(POACEAE: PANICEAE)<sup>1</sup>

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Fernando O. Zuloaga<sup>2</sup> and  
Tatiana Sendulsky<sup>3</sup>

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ABSTRACT

*A revision of Panicum subgenus Phanopyrum section Stolonifera is presented. Panicum soderstromii is described as new, and P. andreanum, P. biglandulare, P. crateriferum, P. irregulare, P. chapadense, P. rude, P. piauiense, P. stoloniferum, P. latissimum, P. pulchellum, and the controversial P. venezuelae are included in this section, which can be characterized by the inflorescences with unilateral racemose branches, the upper antheridium short stipitate at its base and glabrous and smooth, and the presence of non-Kranz leaf anatomy. The presence of one or two (rarely three) pairs of crateriform, ocellate glands is a singular feature of this section; these glands may be constantly present, present or absent in some specimens, or completely absent in others. Keys to all 13 species and SEM micrographs of the upper antheridium and glands on the lower lemma are provided. Each species is illustrated.*

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Section *Stolonifera* is one of the most attractive and interesting sections of the genus *Panicum*. The name was given as an informal group by Hitchcock & Chase (1910), who included in it *P. stoloniferum* Poiret, *P. frondescens* G. Meyer, *P. pulchellum* Raddi, and *P. biglandulare* Scribner & Smith. These species were mainly distinguished in the view of Hitchcock & Chase as summarized in the following diagnosis:

Decumbent or creeping perennials, rooting at the lower nodes, with branching culms; ligule short, membranous; leaf blades lanceolate or ovate-lanceolate; panicles of racemose, secund, spikelike, ascending branches,  $\pm$  divergent from the axis, with spikelets in pairs along one side of the branches; upper glume

and lower lemma exceeding the antheridium in length.

In 1940, Pilger gave the rank of section to species of the *Stolonifera* group. Hsu (1965), in his worldwide treatment of *Panicum*, characterized this section basically as having a papery ligule, panicles with spikelike racemes, upper glume and lower lemma longer than the upper antheridium, the latter smooth, lodicules very thin and weakly three-nerved. Hsu placed this section in his subgenus *Sarmentosum*, along with, among others, sections *Sarmentosa* Pilger, *Parviglumia* (A. Hitchc. & Chase) Pilger, and *Parvifolia* (A. Hitchc. & Chase) Pilger.

In the present work, *Stolonifera* is treated, according to the infrageneric classification of

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<sup>2</sup> Instituto de Botânica Darwinion, Casilla de Correo 22, San Isidro, Argentina.

<sup>3</sup> Instituto de Botânica, Caixa Postal 4005, São Paulo, Brazil.



Zuloaga (1987) within subg. *Phanopyrum* (Raf.) Pilger, being most closely related to sect. *Phanopyrum* and *Laxa*. Section *Phanopyrum* Raf. was raised to generic rank by Nash (1903), taking into consideration as diagnostic characters spikelet compression, habitat, length of the upper anthecium, and presence of a stipe in the base of the upper anthecium. This idea was accepted in recent years by various authors (Brown, 1977; Gould & Shaw, 1983; Lazarides & Webster, 1984). However, we believe that none of these characters are strong enough to maintain *Phanopyrum* apart from *Panicum*. As Hitchcock & Chase (1910) stated: "this species [*P. gymnocarpon*] departs somewhat from the usual characters of the genus *Panicum*, but the divergence does not seem sufficient to justify segregating the single species as the type of a separate genus."

Subgenus *Phanopyrum* includes non-Kranz species, these being anatomically distinguished by having two bundle sheaths around the vascular bundles, the inner mestome sheath with thick-walled cells surrounded by a parenchymatous sheath with thick-walled and completely empty cells (with these parenchymatous sheath cells bigger than the mesophyll cells). The number of mesophyll cells between the vascular bundles ranges from 5 to 12, with a distance of (150)230–270 (–380)  $\mu\text{m}$ . Exomorphologically, the spikelet is characterized by having a lower glume 1–3 (occasionally –5)-nerved and upper glume and lower lemma 5(occasionally –7)-nerved. The species are usually found in shady and humid places, with some exceptions in species of sect. *Lorea*, *Parvifolia*, and *Stolonifera*, some of which grow in open and more or less drier habitats.

Within this subgenus, sect. *Stolonifera* is defined by the following diagnostic features:

**Inflorescence type.** All species are characterized by having the spikelets congested on short, unequal pedicels along racemose, unilateral branches (occasionally with short tertiary branchlets in *P. latissimum* Mikan ex Trin., *P. rude* Nees, and *P. venezuelae*

Hackel), with the branches usually alternate, remote, and diverging from the axis. This character is also present in sect. *Phanopyrum* and sect. *Laxa* (A. Hitchc. & Chase) Pilger. In the former, the spikelets are usually borne on tertiary branchlets appressed unilaterally along secondary branches. Within sect. *Laxa* there is a variation from short-pedicelled spikelets in unilateral racemose branches (as for example in *P. pilosum* Sw. and *P. leptachne* Doell) to spikelets disposed along either side of short tertiary branchlets (e.g., *P. boliviense* Hackel, *P. bresolinii* L. B. Smith & Wassh.). Sections *Parvifolia*, *Monticola* Stapf, and *Verrucosa* (A. Hitchc. & Chase) C. C. Hsu, included in subg. *Phanopyrum*, are characterized by open and lax panicles with long-pedicelled spikelets; in sect. *Lorea* Zuloaga some species have open and lax panicles, whereas others have spikelike inflorescences. In sect. *Megista* Pilger, all the branches of the panicle are whorled, with the spikelets short-pedicelled along the branches. In sect. *Parviglumia*, there is a gradation from species with spikelets arranged in open and diffuse panicles to others with short-pedicelled spikelets along racemose, not unilateral branches.

**Surface and ornamentation of the upper anthecium.** The epidermis of the upper anthecium is completely glabrous, indurate, smooth, and shiny, with scattered stomata toward the upper margins of the palea (Fig. 2c, d). A similar pattern is present within the subgenus in sect. *Phanopyrum* and sect. *Lorea* (in the latter it is possible to find occasional prickly hairs, stomata, and bicellular microhairs toward the apex of lemma and palea). On the other hand, sect. *Laxa* differs by having conspicuous prickly hairs toward the apex as well as simple papillae regularly distributed in longitudinal rows. Membranous antheria are present in some species of this section.

**Stipe presence, type of spikelet, and relative length of the upper anthecium.** In all of the species of the section, the spikelets are biconvex with the upper anthecium short-



ly stipitate at the base; additionally, the anthercium is reduced in relation to the length of the upper glume and lower lemma (usually  $\frac{1}{2}$ – $\frac{3}{4}$  the length of the upper glume and lower lemma).

Sections of subg. *Phanopyrum* can be separated by the following key:

KEY TO THE SECTIONS OF SUBG. *PHANOPYRUM*

- 1a. Upper glume and lower lemma 7–9-nerved; panicles with all the branches whorled ..... sect. *Megista*
- 1b. Upper glume and lower lemma 3–5(occasionally –7)-nerved; with the branches alternate to opposite, not whorled.
  - 2a. Leaf branches stiff, pungent ..... sect. *Lorea*
  - 2b. Leaf blades not pungent, not stiff.
    - 3a. Upper anthercium covered with long, cylindric hairs (occasionally glabrous, when glabrous lower palea absent, lower glume  $\frac{1}{5}$  the length of the spikelet) ..... sect. *Parviglumia*
    - 3b. Upper anthercium without long, cylindric hairs all over its surface (if glabrous lower palea present, and lower glume more than  $\frac{1}{5}$  the length of the spikelet).
      - 4a. Panicles with racemose, unilateral branches, the spikelets disposed in pairs on short pedicels along one side of the branches, sometimes with the spikelets short-pedicelled in short tertiary branchlets on both sides of the branches; upper anthercium smooth, glabrous or with short prickly hairs at the summit.
      - 5a. Upper anthercium glabrous, smooth and shiny, indurate, shortly stipitate, and shorter than the upper glume and lower lemma.
        - 6a. Grasses aquatic, culms succulent; lower glume  $\frac{1}{5}$  the length of the spikelet; upper anthercium  $\frac{1}{3}$  the length of the spikelet. Southeastern United States ..... sect. *Phanopyrum*
        - 6b. Grasses inhabiting forests or edges of forests or in open habitats, culms not succulent; lower glume  $\frac{1}{3}$ – $\frac{3}{4}$  the length of the spikelet; upper anthercium  $\frac{1}{2}$ – $\frac{3}{4}$  the length of the spikelet. Mesoamerica to South America ..... sect. *Stolonifera*
      - 5b. Upper anthercium papillose, with simple papillae regularly distributed in longitudinal rows and prickly hairs toward the apex of lemma and palea, indurate to membranous, almost reaching the same length of the upper glume and lower lemma, not stipitate ..... sect. *Laxa*
    - 4b. Panicles lax and diffuse, the spikelets long- to short-pedicelled, not in unilateral, racemose branches; upper anthercium pilose, with bottle-like bicellular microhairs all over the surface, rugose to smooth.
      - 7a. Upper anthercium smooth and shining ..... sect. *Parvifolia*
      - 7b. Upper anthercium rugose, with transverse or longitudinal and transverse wrinkles.
        - 8a. Upper anthercium with transverse wrinkles. Lower glume  $\frac{1}{5}$  the length of the spikelet; upper glume and lower lemma verrucose. Eastern United States ..... sect. *Verrucosa*
        - 8b. Upper anthercium with longitudinal and transverse wrinkles. Lower glume  $\frac{1}{3}$ – $\frac{1}{2}$  the length of the spikelet; upper glume and lower lemma not verrucose. Mesoamerica to Argentina ..... sect. *Monticola*

A singular and isolated, although not constant, feature of species of sect. *Stolonifera* is the presence of one or two (rarely three) pairs of crateriform and ocellate glands on either side of the midnerve on the outer surface of the upper lemma. These glands are always present in *P. pulchellum*, *P. biglandulare* (Fig. 1a, b), *P. soderstromii* Zuloaga & Sendulsky (Fig. 1c–f), and *P. crateriferum* Sohns, while in *P. rude*, *P. piauiense* Swallen, *P. chapadense* Swallen, and *P. venezuelae* they are sporadic; they are completely absent in *P. stoloniferum*, *P. andreanum* Mez, *P. brachystachyum* Trin., *P. latissimum*, and *P. irregulare* Swallen. Occasionally, one pair

of glands is present on the upper glume of spikelets of *P. venezuelae*; in this species the glands differ from those of the other species by being slightly depressed rather than crateriform (Fig. 2a, b). *Panicum venezuelae* has cleistogamous flowers in most of its spikelets, this character showing up elsewhere in *Panicum* only in subg. *Dichanthelium*. *Panicum irregulare* is the only species within the genus with the lower flower hermaphrodite.

The pubescence of the spikelet may vary from pilose to hispid (as in *P. chapadense*, *P. andreanum*), papillose-pilose (in *P. brachystachyum*), or entirely glabrous (in *P. irregulare* and *P. stoloniferum*).



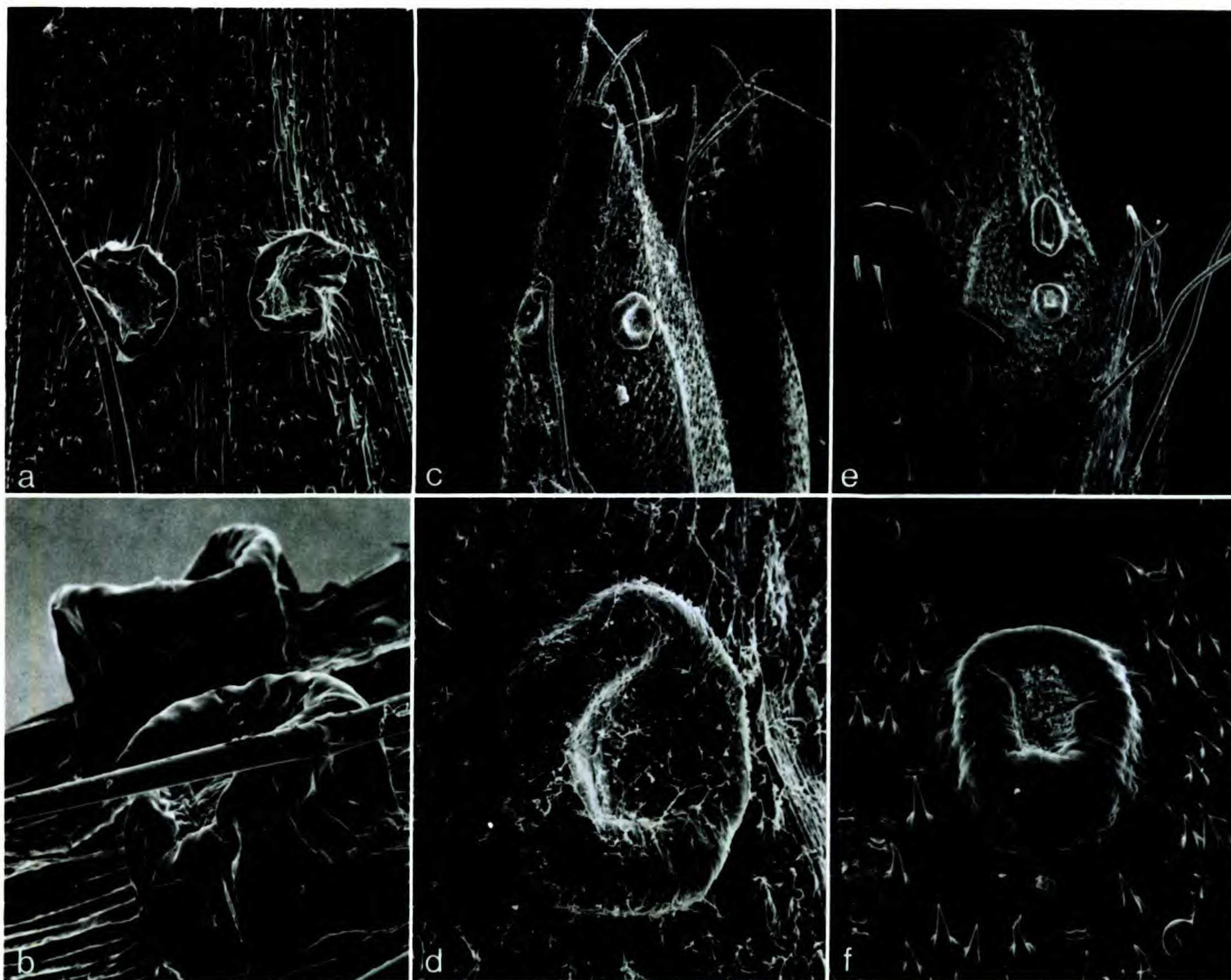


FIGURE 1. Scanning electron micrographs of spikelets of *Panicum* species. a, b. *P. biglandulare*.—a. Lower lemma.—b. Detail of glands on lower lemma. c–f. *P. soderstromii*.—c. Spikelet, ventral view.—d. Detail of gland on lower lemma.—e. Spikelet with two pairs of glands, lateral view.—f. Detail of gland on lower lemma. a, b based on Matuda 316 (US); c–f based on Pereira 2138 (US). Magnifications: a,  $\times 75$ ; b,  $\times 175$ ; c,  $\times 35$ ; d,  $\times 200$ ; e,  $\times 35$ ; f,  $\times 200$ .

Swallen (1966) included eight species in the group *Latissima* of *Panicum*, but he did not delimit it or indicate its links with other species of *Panicum*. The species accepted as valid from the *Latissima* group (*P. rude*, *P. latissimum*, and *P. piauiense*, together with *P. chapadense* and *P. soderstromii*) are treated in the present work in sect. *Stolonifera*, since we regard the habit and size of the plants as insufficiently strong characters to keep them in a different section. It should be pointed out that further anatomical studies would be useful to establish the relationship between species of the *Latissima* group and the rest of species of sect. *Stolonifera*.

Species of sect. *Stolonifera* occur from Mexico to Argentina. Some are widely dis-

tributed while others are found only in restricted areas. To the former group belong *P. stoloniferum* and *P. pulchellum*, the first ranging from Mexico, the Lesser Antilles, and South America to Argentina; *P. pulchellum* ranges from Mexico to Brazil and Bolivia. Two species are confined to Mesoamerica; *P. biglandulare* in Mexico and Guatemala and *P. crateriferum* in Mexico. *Panicum irregulare* grows from Costa Rica to Colombia and *P. andreanum* in Colombia and Venezuela, while *P. venezuelae* is found from Mexico to Brazil. The other species are all endemic to Brazil: *P. brachystachyum* from Minas Gerais, *P. rude* from Espírito Santo to Rio Grande do Sul, *P. latissimum* from Espírito Santo and Rio de Janeiro, *P. chapadense* from Goiás,



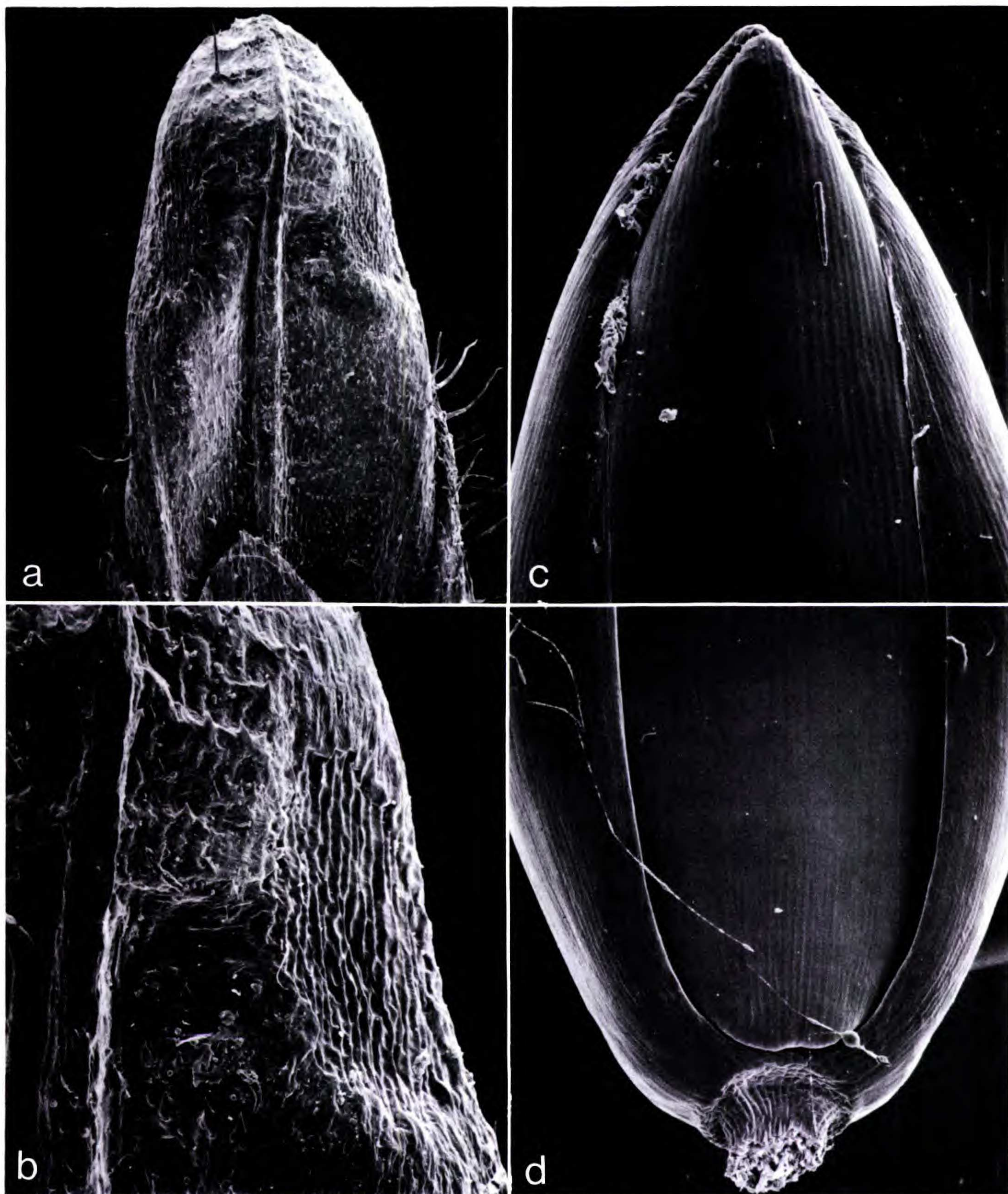


FIGURE 2. Scanning electron micrographs of *Panicum* species. a, b. *P. venezuelae*.—a. Spikelet, ventral side.—b. Detail of gland on lower lemma. c, d. *P. pulchellum*.—c. Apex of the upper antherium, ventral side.—d. Base of the upper antherium showing stipe. a, b based on Pinto 307 (US); c, d based on Hitchcock 20536 (US). Magnifications: a,  $\times 35$ ; b,  $\times 100$ ; c,  $\times 100$ ; d,  $\times 100$ .

*P. piauiense* from Piauí and Bahia, and *P. soderstromii* from Bahia.

Classical taxonomic methods have been applied utilizing a Wild M5 dissecting microscope. Observations at higher magnification

were made using the scanning electron microscope. Anthecia were removed from dried herbarium specimens, secured on stubs, carbon coated in a vacuum evaporator, coated with a gold-palladium alloy, and examined in



a Cambridge S4-10 or Cambridge Stereoscan 250 Mk2 scanning electron microscope operating at 10–20 kV.

TAXONOMIC TREATMENT

***Panicum* section *Stolonifera* A. Hitchc. & Chase ex Pilger, in Engler, Nat. Pflanzenfam. ed. 2, 14e: 16. 1940. TYPE: *P. stoloniferum* Poiret.**

Group *Stolonifera* A. Hitchc. & Chase, Contr. U.S. Natl. Herb. 15: 120. 1910 (nom. inval.); Contr. U.S. Natl. Herb. 17: 461, 500. 1915.

Perennial, plants small to robust, stoloniferous or decumbent, rooting and branching at the lower nodes to erect, leaning in the vegetation or not leaning; culms hollow, rarely solid, simple or branching. Ligule membranous-ciliate to membranous. Leaf blades ovate-lanceolate to long-lanceolate, flat, densely pilose to glabrous, shortly pseudopetiolate. Panicles pyramidal, sometimes oblong, composed of few to numerous, unilateral, racemose branches arranged along either side of the axis and bearing secund, paired, short-pedicellate spikelets. Spikelets ellipsoid

to lanceolate, pilose to glabrous. Lower glume 3(rarely –5)-nerved,  $\frac{1}{4}$ – $\frac{3}{4}$  the length of the spikelet, pilose toward the apex or glabrous. Upper glume and lower lemma subequal (or upper glume shorter than the lemma), acute to acuminate, 5(occasionally –7)-nerved; lower lemma with or without 1 or 2 (occasionally 3) pairs of crateriform, ocellate glands on the middle portion. Lower palea hyaline, glabrous; male flower present or absent (hermaphrodite flower present in *P. irregulare*). Upper anthecium ellipsoid to lanceolate, glabrous, smooth and shiny, indurate, shortly stipitate at the base; upper lemma with the margins inrolled over the palea. Lodicules 3-nerved. Caryopsis with punctiform or ovate hilum, the embryo less than half the length of the caryopsis.

An American section, including 13 species distributed from Mexico to Argentina, commonly found in forests or at the margins of forests, occasionally on “campos rupestres” (*P. brachystachyum*) and on “cerrados” (*P. chapadense*, *P. soderstromii*, *P. piauiense*). Collections come from 0–2,800 m elevation.

KEY TO THE SPECIES OF SECTION *STOLONIFERA*

- 1a. Lower flower hermaphrodite; caryopsis free from the lemma and palea, similar to the caryopsis in the upper anthecium ..... 6. *P. irregulare*
- 1b. Lower flower male or neuter, not hermaphrodite.
  - 2a. Spikelets 4.9–5.2 mm long ..... 3. *P. brachystachyum*
  - 2b. Spikelets 1.8–3.8(–4) mm long.
    - 3a. Leaf blades amplexicaul, 7–12 cm wide ..... 7. *P. latissimum*
    - 3b. Leaf blades not amplexicaul, 0.3–5 cm wide.
      - 4a. Spikelets mostly with cleistogamous flowers; anthers of these flowers 0.2–0.3 mm long; lower lemma gibbous with the upper margins inrolled; upper glume with or without glands ..... 13. *P. venezuelae*
      - 4b. Spikelets with chasmogamous flowers only; anthers 1–2 mm long; lower lemma not gibbous, the upper margins not inrolled; upper glume always without glands.
        - 5a. Spikelets glabrous; lower lemma without glands ..... 12. *P. stoloniferum*
        - 5b. Spikelets pilose; lower lemma with or without glands.
          - 6a. Lower glume  $\frac{1}{2}$ – $\frac{3}{4}$  the length of the spikelet; culms robust and erect; leaf blades lanceolate, 10–45 cm long; Brazil, from Bahia to Rio Grande do Sul.
            - 7a. Lower glume with long, papillose-pilose hairs toward the apex; pedicels and branches with long hairs exceeding the length of the spikelet .... 11. *P. soderstromii*
            - 7b. Lower glume shortly pilose to nearly glabrous, without long, papillose-pilose hairs toward the apex; pedicels and branches short-pilose to scabrous.
              - 8a. Plants with long, creeping rootstocks, each erect culm with the lowest internodes orange and cormlike ..... 4. *P. chapadense*
              - 8b. Plants short-rhizomatous, without the lowest internodes orange and cormlike.
                - 9a. Plants with thickened, fusiform roots; culms branched; panicles 7–22 cm long; Brazil, Bahia, Piauí ..... 8. *P. piauiense*



- 9b. Plants with thin roots; culms simple or rarely branched; panicles 20–60 cm long; Brazil, Espírito Santo to Rio Grande do Sul ..... 10. *P. rude*
- 6b. Lower glume  $\frac{1}{3}$ – $\frac{1}{2}$  the length of the spikelet; culms extensively creeping and rooting at the lower nodes; leaf blades ovate-lanceolate to lanceolate, 2.5–10 cm long; Mesoamerica to Colombia and Venezuela (*P. pulchellum* in Brazil, species with leaves 2.5–5.5 cm long, spikelets 1.8–2.3 mm long).
- 10a. Lower lemma without glands; spikelets length:width ratio 5–6:1. Leaf blades lanceolate ..... 1. *P. andreanum*
- 10b. Lower lemma with glands; spikelets length:width ratio 3–4:1. Leaf blades ovate-lanceolate to lanceolate.
- 11a. Spikelets (3–)3.2–3.7(–4) mm long; nodes glabrous ..... 2. *P. biglandulare*
- 11b. Spikelets 1.8–3.1 mm long; nodes densely pubescent.
- 12a. Spikelets 1.8–2.3 mm long; lower glume separated from the upper glume by a conspicuous internode; leaf blades length:width ratio 2.5:1 ..... 9. *P. pulchellum*
- 12b. Spikelets 2.5–3.1 mm long; internode inconspicuous between the lower and upper glume; leaf blades length:width ratio 6:1 ..... 5. *P. crateriferum*

**1. *Panicum andreanum* Mez, Bot. Jahrb. Syst. 56, Beibl. 125: 5. 1921. TYPE: Venezuela. Trujillo: Escuque, Moritz 1538 (lectotype, B, fragments at US (80458, 1108611)). Figure 3.**

Slender, creeping perennials with the *culms* decumbent and rooting at the lower nodes, then becoming erect and climbing up to 2.5 m into the shrubs, freely and densely branching at the lower and upper nodes; internodes cylindric, hollow, glabrous to sparsely pilose, 1.5–8 cm long; nodes brown, glabrous to sparsely pilose. *Leaf sheaths* 2–7 cm long, commonly longer than the internodes at basal nodes or shorter at the upper ones, glabrous, striate and auriculate, the auricles small, densely pilose, one of the margins densely ciliate, the other glabrous. *Ligule* membranous-ciliate, 0.3–0.5 mm long; external ligule conspicuous, formed by a row of dense whitish hairs. *Leaf blades* lanceolate, 3–9 cm long, 0.3–0.6(–1.1) cm wide, flat, tapering into a finely attenuate apex, slightly narrowed to subcordate basally, hirsute, with long, thick papillose hairs to glabrous on both surfaces, the margins scabrous and cartilaginous, ciliate or glabrous basally; *pseudopetiole* glabrous, ca. 2 mm long. *Panicles* terminal, oblong, 6–16 cm long, 1–3 cm wide, with racemose primary branches alternate and divergent from the axis, the spikelets borne in pairs on short, unequal scabrous or pilose pedicels (the lower sessile), these arranged along lower sides

of branches; axis longitudinally ridged, smooth, scabrous, the axis of the branches triquetrous, scabrous, the axils of the branches pilose with dark hairs. *Spikelets* lanceolate, somewhat compressed laterally, 2.5–2.8 mm long, 0.4–0.6 mm wide, acuminate, greenish to stramineous, pilose, with the upper glume and lower lemma subequal (or the upper glume a little shorter than the lemma). *Lower glume* ovate, acute, 1.1–1.4 mm long,  $\frac{1}{3}$ (– $\frac{1}{2}$ ) the length of the spikelet, 3-nerved, the midnerve scabrous toward the apex, shortly pilose on the inner surface, sparsely pilose on the outer surface, bearing a few long hairs at the base. *Upper glume* 2.2–2.4 mm long, 5(–7)-nerved, the midnerve scabrous toward the apex, with long hairs in the hyaline margins. *Lower lemma* glumiform, 2.4–2.6 mm long, 5-nerved, hispid toward the margins. *Lower palea* lanceolate, 1.8–2.1 mm long, 0.3–0.4 mm wide, hyaline, short-pubescent at the apex, otherwise glabrous, the margins scabrous; male flower present. *Upper antheridium* lanceolate, 1.7–1.8 mm long, 0.4 mm wide, stramineous. *Caryopsis* ovoid, 1.2 mm long, 0.3 mm wide; hilum oblong. In flower November to May.

*Distribution.* Venezuela and Colombia. In wet forests on sandy soils at 400–1,800 m elevation.

*Additional specimens examined.* COLOMBIA. CUNDINAMARCA: near Quetame, Río Negro valley, between Quetame and Piperal, Killip 34220 (COL, US); entre Quetame y Sasumuco, Triana 263 (US); Quetame, Triana



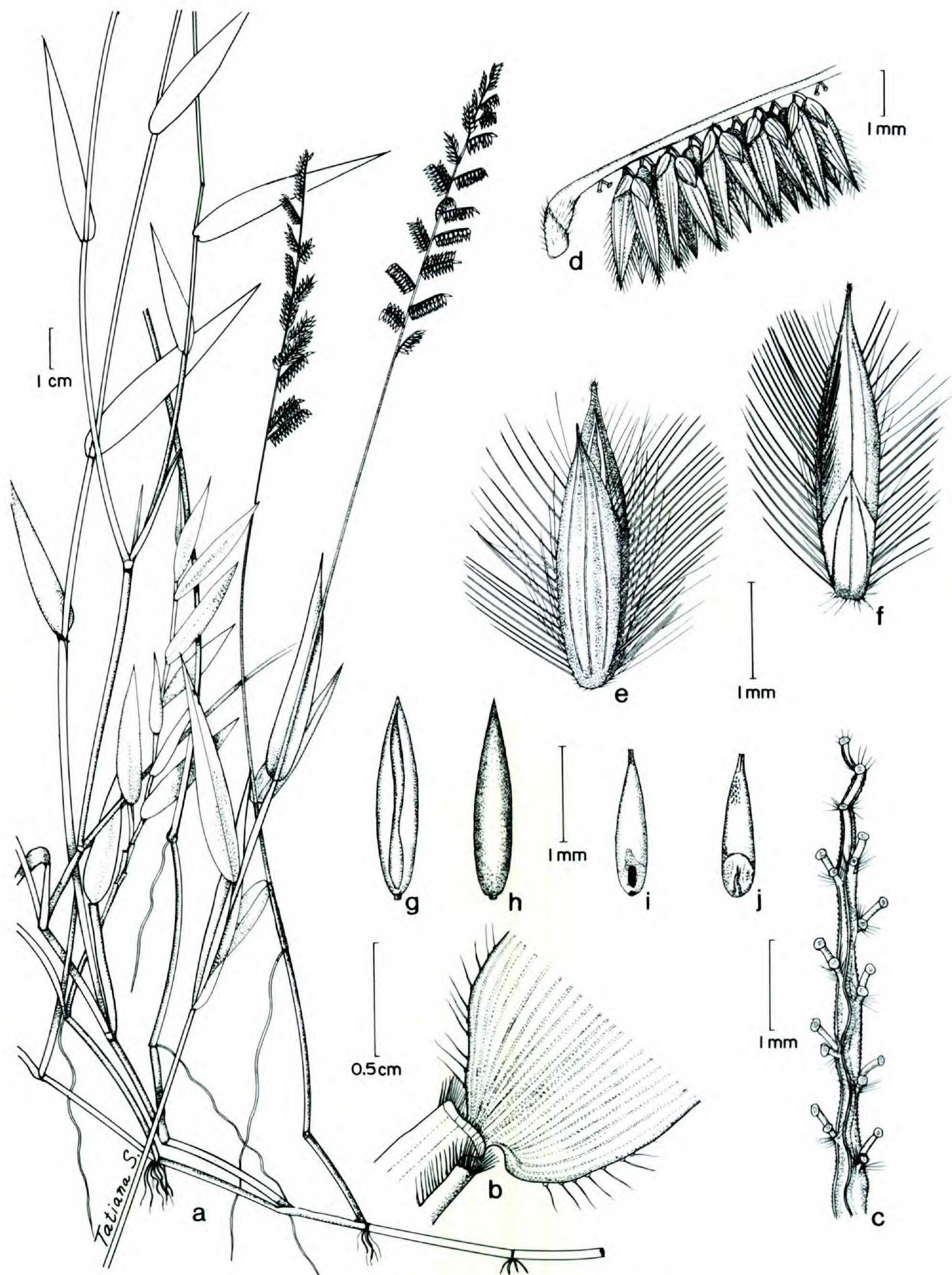


FIGURE 3. *Panicum andreanum*.—*a*. Habit.—*b*. Ligule.—*c*. Branch of a panicle showing pedicels.—*d*. Racemose branch.—*e*. Spikelet, dorsal view.—*f*. Spikelet, ventral view.—*g*. Upper antheridium, ventral view.—*h*. Upper antheridium, dorsal view.—*i*. Caryopsis, hilum side.—*j*. Caryopsis, embryo side. Based on Muller s.n. (US-1762338).

13 (COL). META: Cordillera de La Macarena, mesa del Río Sansa, *Idrobo & Schultes* 1291 (US); Las Lagartijas, plateau between Río Papamene and Río Duda, Colombia—Uribe trail, 11 km SW of Uribe, *Fosberg* 19508 (US); carretera a Villavicencio, entre Puente Quetame y Buena

Vista, *García Barriga et al.* 18936 (COL); 14 km NW of Villavicencio along the road to Bogotá, *Davidse & Llanos* 5516 (COL); Villavicencio, *André* 871 (paratype, B). NORTE DE SANTANDER: región del Sarare, hoya del Río Marguá entre Junín y Córdoba, *Cuatrecasas* 13373 (COL,



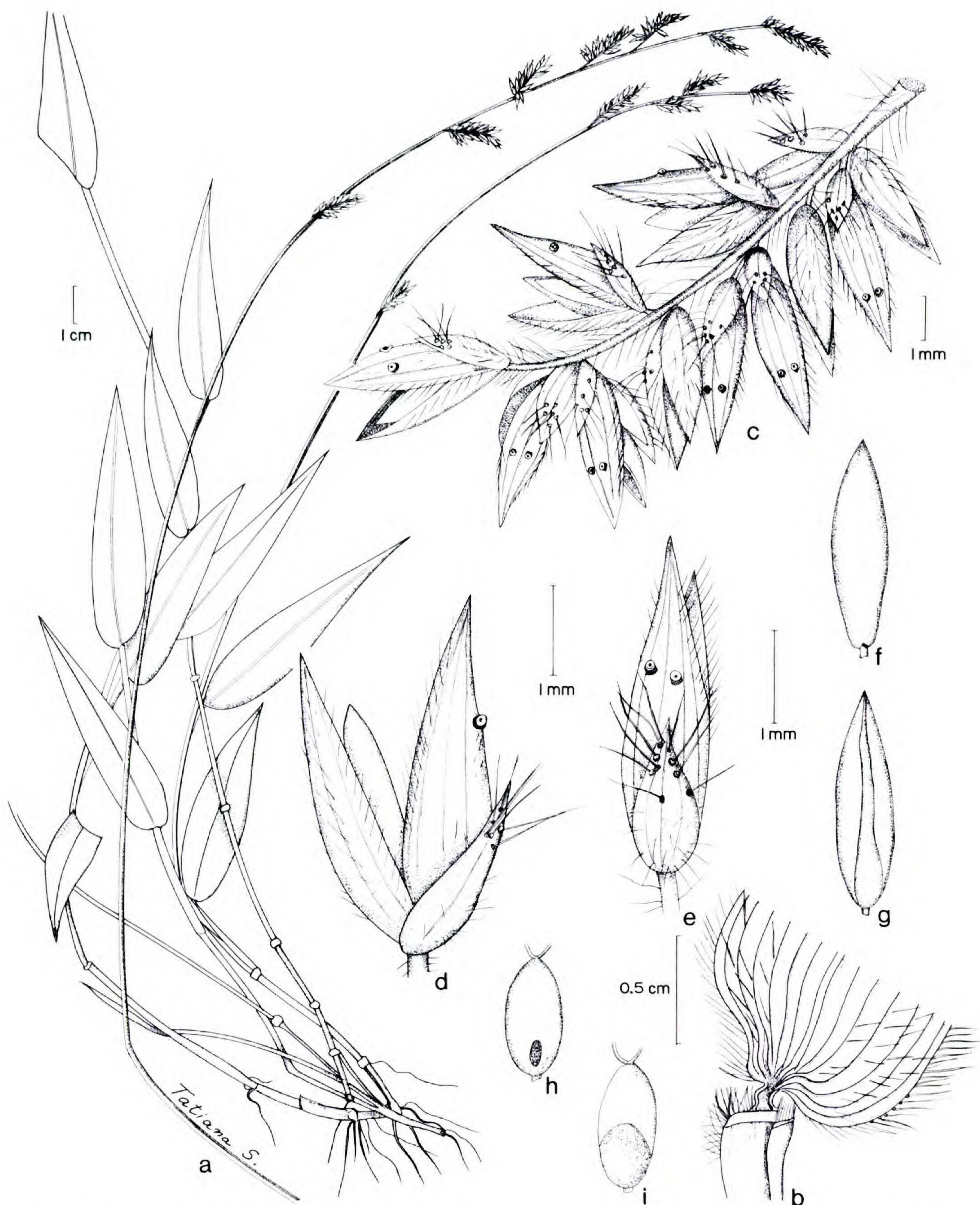


FIGURE 4. *Panicum biglandulare*.—*a*. Habit.—*b*. Ligule.—*c*. Racemose branch.—*d*. Spikelet, lateral view.—*e*. Spikelet, ventral view.—*f*. Upper antheridium, dorsal view.—*g*. Upper antheridium, ventral view.—*h*. Caryopsis, hilum side.—*i*. Caryopsis, embryo side. *a*, *b* based on Matuda 316 (US); *c*–*i* based on Matuda 2006 (US).

US). Without department and locality, *Karsten s.n.* (paratype, US). VENEZUELA. MÉRIDA: between Mucuchachi and Canagua, *Steyermark* 56345 (US). TÁCHIRA: Cordero, *Muller s.n.*, 14 Nov. 1939 (US-1762338); Cerro Las Minas, 18 km SE of Santa Ana, *Steyermark et al.* 120043 (US); Cerro La Camirí, just south of the town of Río

Negro, *Davidse & González* 21555 (US); 2 km E of El Variante, *Davidse & González* 21523 (US).

When describing this species, Mez cited three syntypes for it, of which the specimen



*Moritz 1538* is selected here as lectotype of *P. andreanum*, taking into consideration its protologue.

**2. *Panicum biglandulare*** Scribner & Smith, U.S.D.A. Bull. (1895–1901) 4: 13, pl. 4. 1897. TYPE: Mexico. Chiapas: near Pinabete, 8 Feb. 1896, at an altitude of 6,500 to 8,000 feet, *Nelson 3781* (holotype, US; isotype, GH). Figure 4.

Perennials 40–80(–100) cm tall. *Culms* decumbent and rooting at the lower nodes or ascending, branching, with many nodes; internodes cylindric, hollow, sparsely pilose to glabrous, with thin, whitish hairs; nodes greenish to purplish, constricted, glabrous. *Leaf sheaths* 2–4 cm long, usually shorter than the internodes, striate, densely ciliate at the margins, otherwise glabrous. *Ligule* membranous, shortly ciliate or glabrous at the apex, 0.3–0.5 mm long, external ligule a conspicuous ring of white hairs or absent; collar shortly pilose. *Leaf blades* ovate-lanceolate to lanceolate, 3–10.5 cm long, 1.1–1.9 cm wide, acuminate, with strigose to papillose hairs on both surfaces to glabrous, asymmetrical and subcordate basally, the margins ciliate to scabrous, the lateral nerves anastomosing; *pseudopetiole* short, glabrous to short-pilose. *Panicles* exserted, oblong, 8–18 cm long, 1–4 cm wide, with 5–10 short, sparse, alternate, and racemose branches, these slightly divergent from the axis, the spikelets borne in pairs (the lower one occasionally abortive) on the branches, the axis of the branches triquetrous (rather flat), hirsute, more so toward the base; the axils of the branches densely pilose; pedicels short, hispid. *Spikelets* lanceolate, acuminate, hispid, (3–)3.2–3.7(–4) mm long, 1–1.1 mm wide, greenish to purplish. *Lower glume* ovate, acute, 1.3–1.8 mm long,  $\frac{1}{3}$  the length of the spikelet, hirsute on the outer surface, sparsely and shortly pilose basally, with long, papillose-pilose hairs toward the apex, 3-nerved, the midnerve finely scabrous at the upper part. *Upper glume* shorter than the lower lemma, sometimes leaving the summit of the anthe-

cium exposed, acute, 5(–7)-nerved, glabrous on the inner surface, with stiff, papillose hairs on the outer surface, these becoming more abundant toward the hyaline margins. *Lower lemma* acute, 5(–7)-nerved, scabrous, with long, papillose hairs toward the hyaline margins; 2 conspicuous crateriform glands present between the midnerve and the 2 immediate lateral nerves. *Lower palea* lanceolate, acute, 3–3.2 mm long, 0.8 mm wide, membranous, scabrous at the margins, otherwise glabrous; male flower present, anthers ca. 1.3 mm long. *Upper antheridium* lanceolate, acute, 2–2.5 mm long, 0.7–0.8 mm wide, stramineous. *Caryopsis* ellipsoid, 1.4 mm long, 0.6 mm wide, brown; hilum oblong. In flower November to August.

*Distribution.* Occurring in Mexico and Guatemala in forests between 1,300 and 2,800 m elevation.

*Additional specimens examined.* GUATEMALA. ALTA VERAPÁZ: Cobán, *von Tuerckheim II 1342* (GH, NY, US), *II 1956* (NY, US); hills between Cobán and Tres Cruces, *Standley 90263* (F, US). SAN MARCOS; near Aldea Fraternidad, between San Rafael Pié de la Cuesta and Palo Gordo, west-facing slope of the Sierra Madre mountains, *Williams et al. 26050* (F, NY, US); barrancas 6 mi. S and W of town of Tajumulco, northwestern slopes of Volcán Tajumulco, *Steyermark 36678* (F, US). MEXICO. CHIAPAS: 2 mi. NE of Pueblo Nuevo Solist, *Lathrop 5820* (US); Laguna Montebello, Montebello National Park, *Breedlove & Dressler 29530* (F, NY); SE of Cerro Baúl on the border with the state of Oaxaca, 16 km NW of Rizo de Oro along a logging road to Colonia Gigaroa, *Breedlove & Smith 21699* (NY); 5 km SE of Jitotol along road to Bochil, *Breedlove 23323* (NY); Montebello, *Carlson 2330* (US), 2332 (MO); Montecristo, *Matuda 2006* (F, GH, NY, US); Mt. Pasitar, *Matuda 316* (RB, US); in the paraje of Kulak'tik, *Ton 1713* (F); 25 mi. E of La Trinitaria, Lago of Monte Bello, *Breedlove 9680* (US); Clínica Yerba Buena, 2 km NW of Pueblo Nuevo Solistahuacán, *Raven & Breedlove 19846* (US); Sierra Madre, *Tateoka 1009* (US).

**3. *Panicum brachystachyum*** Trin., Gram. Pan. 138. 1826. TYPE: Brazil. Minas Gerais: Serra do Cipó, Jan. 1825, *Langsdorff s.n.* (holotype, LE, not seen, fragment at US; isotype, P). Figure 5.

Perennials ca. 18–35 cm tall. *Culms* erect, branching at the base; internodes cylindric, hollow, sparsely pilose; nodes stramineous,



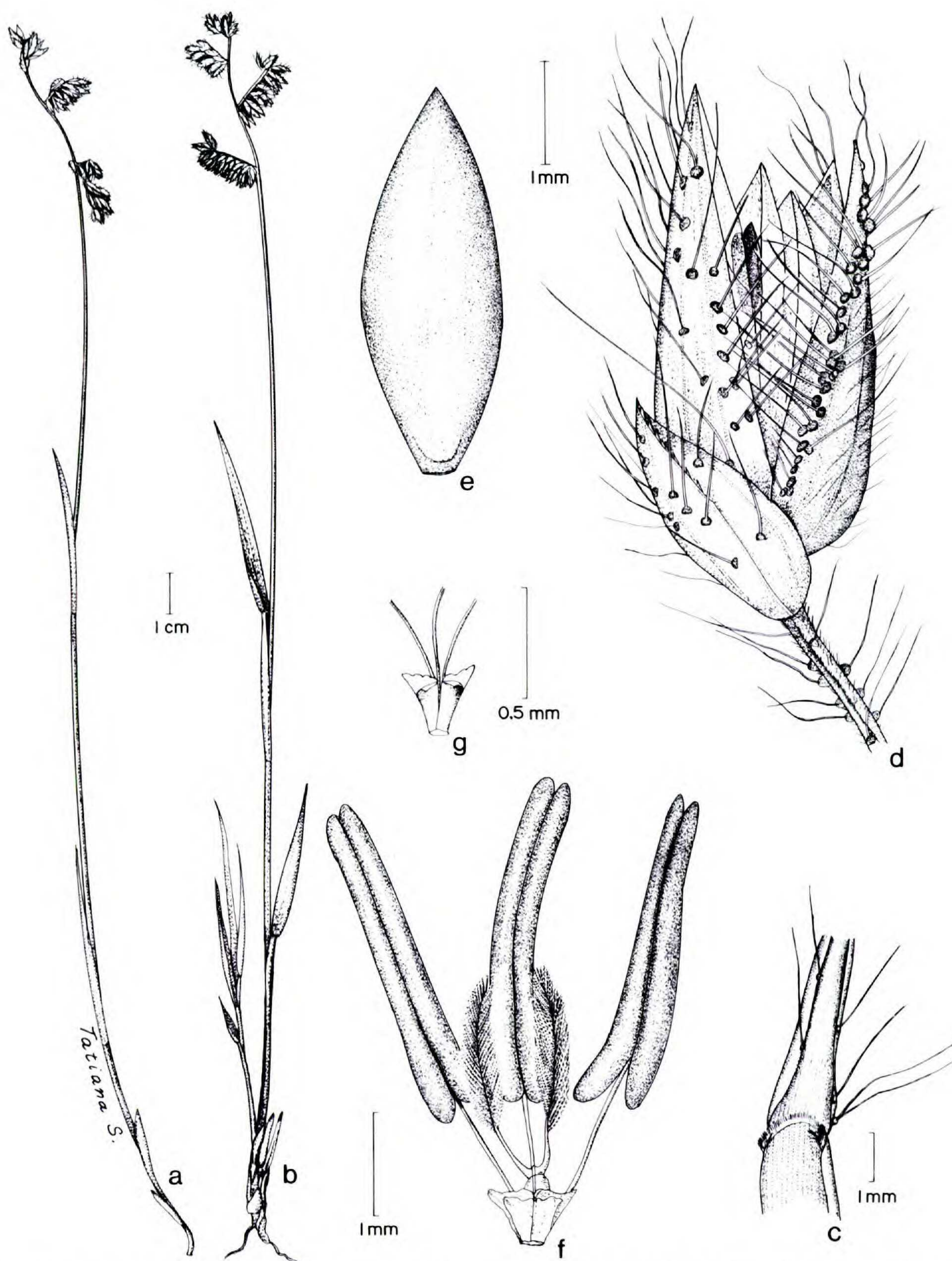


FIGURE 5. *Panicum brachystachyum*.—*a, b*. Habit.—*c*. Ligule.—*d*. Spikelet, lateral view.—*e*. Upper antherium, dorsal view.—*f*. Flower.—*g*. Lodicules. *a, c–g* based on Langsdorff s.n. (US); *b* based on plate of Trinius (1829).

glabrous to short-pilose. *Leaf sheaths* stramineous, striate, sparsely pilose, with small auricles, densely pilose, the margins short-ciliate. *Ligule* membranous-ciliate, arcuate, 0.3–0.4 mm long. *Leaf blades* lanceolate, 3–4.5 cm long, 0.2–0.3 cm wide, acuminate,

flat or subinvolute, glabrous, subcordate to narrowed basally, the margins scabrous and with sparse, papillose hairs; the midnerve inconspicuous. *Panicles* exserted, formed of 2–4 alternate, densely flowered, distant and spreading racemose branches 1–4 cm long;



peduncle hispid; axis flattened, scabrous and long-hispid, the axils of the branches densely papillose; axis of the branches hispid to scabrous, the pedicels arranged in pairs on one side of the branch, the pedicels triquetrous, hispid and with long papillose-pilose hairs. *Spikelets* broadly ellipsoid, 4.9–5.2 mm long, ca. 3.5 mm wide, grayish, gaping; glumes and lower lemma with long papillose-pilose hairs, the upper glume and lower lemma subequal, acute to acuminate, exceeding the upper anthecium in length. *Lower glume* ovate, acuminate, 2.8–3 mm long,  $\frac{1}{3}$ – $\frac{1}{2}$  the length of the spikelet, covered with thick, papillose hairs, 1–3(–5)-nerved, the midnerve scabrous. *Upper glume* broadly ovate, 5-nerved, with thick papillose hairs near the margins, the rest of the surface with fine whitish hairs. *Lower lemma* glumiform, 3–5-nerved, with sparse, irregularly scattered, papillose hairs, these more dense toward the apex, the margins hyaline. *Lower palea* lanceolate, 3.9–4.5 mm long, 1.2 mm wide, membranous, the margins shortly ciliate; male flower present, the anthers dark purple, 3.2 mm long. *Upper anthecium* lanceolate, 4–4.4 mm long, 1.2 mm wide, membranous, acute to acuminate, whitish to stramineous; lemma slightly carinate, 3–5-nerved; anthers ca. 3.3 mm long, lodicules ca. 0.5 mm long, cuneate, with raised distal margins; ovary ovoid; anthers dark purple. *Caryopsis* not seen.

This species has been collected only once, in 1825, by Langsdorff “in saxosis montis alti da Lapa,” now the Serra do Cipó, Minas Gerais, Brazil. The collection presumably consisted of a single individual, which was divided in three parts. One part is the holotype in LE, from which the plate in Trinius (1829) was probably drawn. The second part is the P isotype. The third part is a fragment of the type (taken from the LE specimen) in US and consists of a single branch without base. The plant from the Trinius plate and the US specimen are illustrated in the present paper to give a more complete view of this rare and probably extinct grass. Many collecting trips have been made to the Serra of Cipó by T.

Sendulsky and by other botanists, but this species has never been collected again.

**4. *Panicum chapadense*** Swallen, Contrib. Science 22: 8, fig. 4. 1958. TYPE: Brazil. Goiás: collected on sandstone outcrop, 7 km south of Veadeiros, region of the Chapada dos Veadeiros, 24 Apr. 1956, Dawson 14602 (holotype, R; isotype, US). Figure 6.

*P. pirineosense* Swallen, Phytologia 14: 78. 1966. TYPE: Brazil. Goiás: collected between rocks, at Pirineus, 18 Oct. 1956, Macedo 4805 (holotype, US; isotypes, BAA, SP, US).

Rather robust perennials with long, creeping, horizontal rootstocks, the culms erect, 50–140 cm tall, with a cormlike base, 2 or 3 basal internodes orange-colored, 1–4 cm diam., glabrous, shining, lightly covered with aphyllous, velutinous old scales; new innovations appearing between those thickened internodes and covered by small, hard, yellow, pilose scales; upper internodes cylindric, solid, shortly pilose or glabrous, striate; nodes dark, constricted and shortly pilose, the first node swollen, yellow, glabrous, shining. *Leaf sheaths* stramineous, 5–11 cm long, longer (basal) or shorter than the internodes, densely villous to papillose-pilose all over the surface or pilose toward the apex only; the upper margins ciliate, the lower ones membranous; auricles small, rounded, sometimes densely pilose. *Ligule* membranous, ciliate, ca. 0.5 mm long, with or without long hairs behind the membrane at the base of the blade; external ligule present or absent. *Leaf blades* lanceolate, 12–23 cm long, 1.3–2.5 cm wide, with ciliate to scabrous margins, subcordate basally and velutinous to glabrous on both surfaces, the midnerve not prominent; *pseudopetiole* small. *Panicles* terminal, lax, oblong to pyramidal, with many flowers, 13–26 cm long, 2–6 cm wide, the primary branches racemose, dense and alternate, appressed or slightly divergent from the axis (the lower branches shortly branching at the very base), the spikelets secund and arranged in pairs on





FIGURE 6. *Panicum chapadense*.—a. Leafy stems.—b. Culm showing cormlike base.—c. Ligule.—d. Portion of a racemose branch.—e. Spikelet, ventral view, lower lemma with glands.—f. Spikelet, lateral view.—g. Spikelet, dorsal view.—h. Spikelet, ventral view, lower lemma without glands.—i. Upper antheridium, ventral view.—j. Upper antheridium, dorsal view. Based on Burman & Filgueiras 450 (SP).

short, unequal pedicels, on the lower side of the branches; axis longitudinally ridged, nearly glabrous or finely hispid, the axis of the branches triquetrous, hispid to scabrous, the

axils of the branches densely pilose, brownish, sometimes with 1 or 2 long hairs; pedicels hispid and slightly pubescent. *Spikelets* narrowly ellipsoid, 2.5–3(–3.3) mm long, 0.6–



0.8 mm wide, stramineous, with purplish traces, the upper glume and lower lemma subequal and exceeding the upper anthercium in length. *Lower glume* ovate, acute, 1.6–1.9 mm long,  $\frac{1}{2}$ – $\frac{3}{4}$  as long as the spikelet, 3(–5)-nerved, shortly pubescent on both surfaces (more so on the upper surface). *Upper glume* acute, 2.2–2.8 mm long, 5-nerved, the midnerve scabrous, densely hispid on the outer surface, with long, papillose, whitish and fringed hairs toward the margins, the inner surface pilose toward the apex. *Lower lemma* glumiform, 2.2–2.8 mm long, 5-nerved, with a pubescence similar to that of the upper glume, with or without 2–4 crateriform glands on the middle portion. *Lower palea* lanceolate, 1.8–2.2 mm long, 0.5–0.7 mm wide, stramineous, shortly pubescent, the margins ciliate; male flower present. *Upper anthercium* narrowly ovoid, 1.5–1.9 mm long, 0.5–0.7 mm wide, acute, stramineous. *Caryopsis* not seen. In flower March to October.

*Distribution.* Endemic to Goiás, Brazil. Occurring in “campos rupestres” and “cerados” between stones in rocky habitats at 1,000–1,600 m elevation.

*Additional specimens examined.* BRAZIL. GOIÁS: 5–15 km S of Veadeiros, road to São João d’Aliança, *Prance & Silva* 58824 (MO, NY, US); 22 km N of Alto do Paraíso, *Irwin et al.* 32492 (F, NY); 20 km by road N of Alto Paraíso, *Anderson* 6760 (NY, UB, US); ca. 15 km S of Goiás Velho, *Anderson* 9976 (UB); ca. 15 km N of Corumbá do Goiás, *Anderson* 10305 (UB); serra do Pirineus, *Burman & Filgueiras* 410, 450 (SP); 12 km NW of Veadeiros, road to Cavalcante, *Irwin et al.* 9419 (US); ca. 15 km S of Veadeiros, *Irwin et al.* 12782 (MO, NY); Corumbá, Montes Pirineus, *Onishi et al.* 98 (R). Without locality, *Macedo* 4380 (US).

A remarkable feature of this species is the presence of cormlike structures at the base of each culm, a character occasionally present in other species of *Panicum*, for example, *P. bulbosum* Kunth and *P. paucifolium* Swallen.

When describing *P. chapadense*, Swallen included it in sect. *Laxa*. This species has no affinity with sect. *Laxa*, being distinct by the type of spikelet, presence of glands on the lower lemma, and smooth and glabrous upper anthercium.

**5. *Panicum crateriferum* Sohns, J.** Wash. Acad. Sci. 46: 378, figs. 10–22. 1956. TYPE: Mexico. Guerrero: on steep grassy slopes and narrow ravine with open pine woods and scattered oaks on granitic soil at km 339–340 between Acahuizotla and Agua de Obispo, on highway to Acapulco, ca. 3,000 ft., 1 Oct. 1949, *Moore Jr.* 5148 (holotype, US; isotype, GH). Figure 7.

Perennials, the *culms* decumbent, creeping and rooting at the lower nodes, becoming erect, 20–60 cm tall, branching; internodes hollow, 2.5–6 cm long, glabrous to sparsely pilose with whitish long hairs; nodes dark, densely pilose with whitish hairs. *Leaf sheaths* 0.8–2.5 cm long, shorter than the internodes, glabrous to hispid, more densely so toward the upper portion, the margins long-ciliate toward the apex, otherwise glabrous; collar a nitid, wide rim of dense, whitish, antrorse hairs. *Ligule* membranous-ciliate, ca. 0.4 mm long. *Leaf blades* ovate-lanceolate to lanceolate, flat, 4–6 cm long, 0.6–1.3 cm wide, asymmetrical basally, with the adaxial surface sparsely papillose-strigose, the abaxial surface glabrous to sparsely papillose-strigose, the margins ciliate basally, otherwise glabrous; midnerve inconspicuous, the lateral nerves anastomosing; *pseudopetiole* small, pilose. *Panicles* lax, 5–10 cm long, 1.5–6 cm wide, with 4–6 racemose and alternate branches, distant and divergent from the rachis, the uppermost branch consisting of a long pedicel and a single spikelet only; the spikelets borne in pairs, one subsessile (occasionally abortive), the other shortly pedicellate, arranged along the lower side of the branches; axis longitudinally ridged, glabrous, the axis of the branches triquetrous (one side flattened), scabrous, with or without scarce, long, papillose hairs, the axils of the branches densely pilose with stiff and papillose hairs; pedicels short, scabrous. *Spikelets* narrowly ovoid to lanceolate, 2.5–3.1 mm long, 0.8–1.1 mm wide, sparsely to densely papillose-pilose or hirsute, the glumes and lower lemma subequal or the upper glume a little shorter than the lemma,



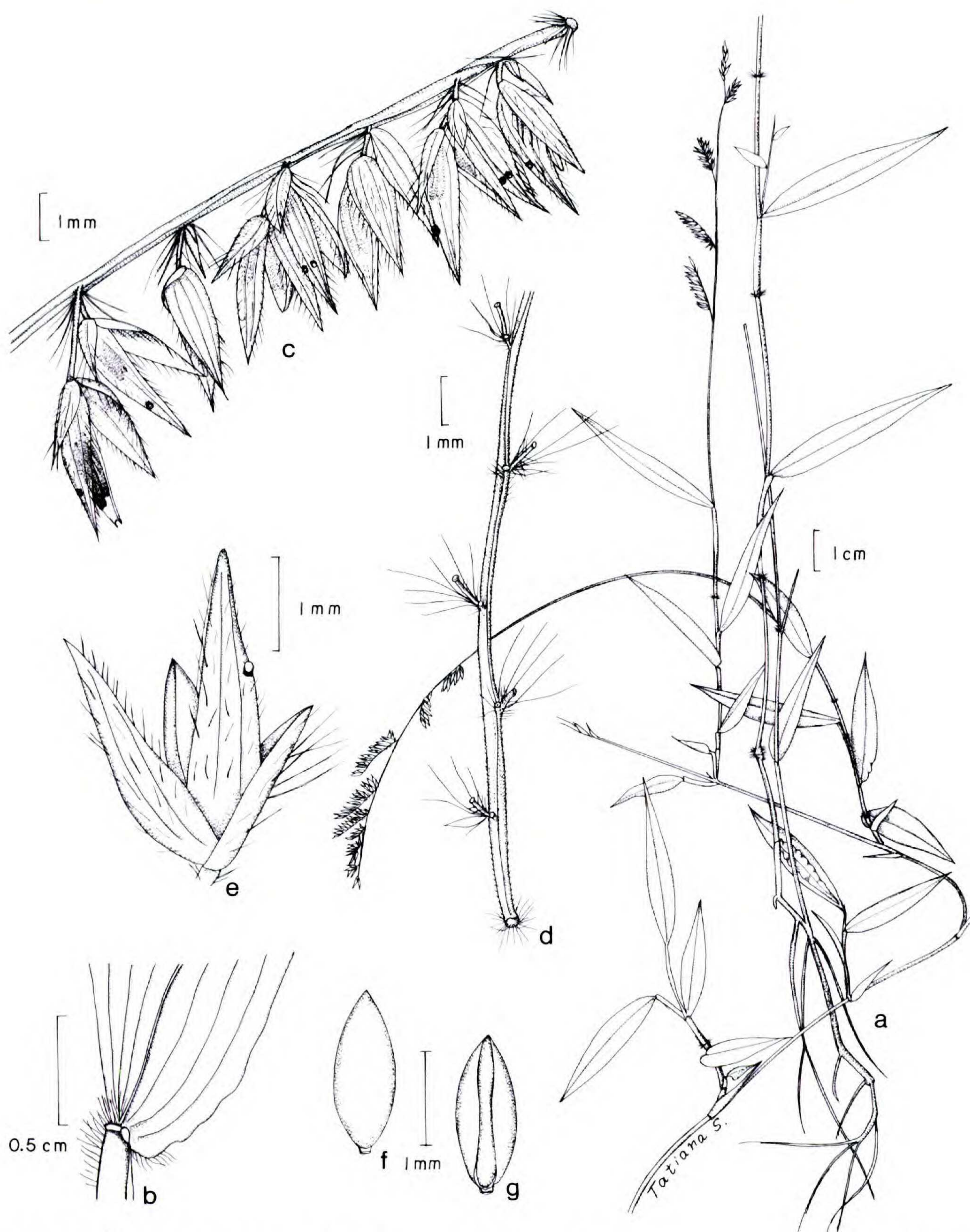


FIGURE 7. *Panicum crateriferum*.—a. Habit.—b. Ligule.—c. Portion of a racemose branch.—d. Portion of a branch showing pedicels.—e. Spikelet, lateral view.—f. Upper antheridium, dorsal view.—g. Upper antheridium, ventral view. Based on Hinton et al. 10801 (US).

acute, the margins hyaline. *Lower glume* ovate-lanceolate, 1.3–2 mm long,  $\frac{1}{3}$ – $\frac{1}{2}$  the length of the spikelet, acuminate, with long papillose-pilose hairs toward the apex and margins, the rest of the surface shortly pilose, 3(–5)-nerved, the midnerve scabrous. *Upper*

*glume* 2.1–2.8 mm long, 5(–7)-nerved, papillose-hirsute toward the apex. *Lower lemma* 2.4–3 mm long, glumiform, 5(–7)-nerved, sparsely pilose, long-pilose or glabrous toward the margins, with 2 crateriform glands toward the upper part. *Lower palea* lanceolate, 2.2–



2.6 mm long, 0.5–0.6 mm wide, hyaline, ciliate at the margins, scabrous at the apex; male flower present. *Upper anthecium* ellipsoid, 1.5–2 mm long, 0.5–0.6 mm wide, stramineous. *Caryopsis* not seen. In flower October to November.

*Distribution.* Endemic to Guerrero and Oaxaca, Mexico; up to 1,000 m elevation.

*Additional specimens examined.* MEXICO. GUERRERO: Carrizo-Santo Domingo, *Hinton et al.* 14725 (paratype, US); Plan del Carrizo, *Hinton et al.* 14646 (paratype, US); Montes de Oca, *Hinton et al.* 10801 (paratype, US). OAXACA: region of Chinantla, Santa María de Lovaoi, San Juan de Petlapa, *Vera Santos* 3437 (US); La Soledad, *Ernst* 2593 (US).

A few three-flowered spikelets were found on the collection *Hinton et al.* 10801; here the spikelets had two lower flowers, one neuter and the other with stamens, and one hermaphrodite flower in the upper anthecium. These spikelets have two lemmas, both with crateriform glands, one neuter (the lower without a palea) and the other, in an intermediate position, with its corresponding palea and male flower.

This characteristic three-flowered spikelet has been found previously and consistently in *P. quadriglume* (Doell) A. Hitchc.

**6. *Panicum irregulare*** Swallen, J. Wash. Acad. Sci. 30: 216. 1940. TYPE: Costa Rica. San José: vicinity of El General, 760 m, Feb. 1939, *Skutch* 4115 (holotype, US; isotypes, GH, MO, NY). Figure 8.

Probably perennials. *Culms* decumbent, rooting and branching at the lower nodes, becoming erect, 60–80 cm tall; internodes cylindric, 4.3–11 cm long, glabrous, hollow; nodes glabrous. *Leaf sheaths* 3.2–4.8 cm long, shorter than the internodes, auriculate, the auricles pilose, the margins glabrous, membranous. *Ligule* membranous-ciliate, 0.3–0.5 mm long, with long hairs toward the base of the blade; adaxial surface of the collar shortly and densely pilose. *Leaf blades* ovate-lanceolate, 7–13 cm long, 1.5–3.3 cm wide, narrowed and somewhat asymmetrical basal-

ly, finely scabrid and with strigose hairs to nearly glabrous on the adaxial surface, the abaxial surface finely scabrid to nearly glabrous, the midnerve conspicuous, the lateral nerves anastomosing; *pseudopetiole* pilose, stramineous, ca. 1 mm long. *Panicles* terminal, oblong, exserted, 14–28 cm long, 3–7 cm wide, with 15–30 racemose branches  $\pm$  divergent from the axis, alternate, and distant, usually drooping, the spikelets borne in pairs, one subsessile (occasionally abortive), the other shortly pedicellate arranged along one side of the branch; axis cylindric, finely scabrid, the axis of the branches somewhat flattened, scabrous, sparsely hirsute, the axils of the branches pilose; pedicels triquetrous, scabrous, pilose toward the base. *Spikelets* long-ellipsoid, biconvex, 1.8–2.3 mm long, 0.7–1 mm wide, greenish, scabrous to short pilose, the upper glume and lower lemma subequal (or the upper glume occasionally shorter), both with long hairs toward the margins to glabrous. *Lower glume* ovate, acute, 0.7–1.1 mm long,  $\frac{1}{4}$ – $\frac{1}{2}$  the length of the spikelet, 3-nerved, the midnerve scabrous. *Upper glume* 5-nerved, acute, pilose to finely scabrid toward the apex. *Lower lemma* glumiform, 5-nerved, acute, scabrous toward the apex. *Lower palea* elliptic, 1.4–1.5 mm long, 0.5 mm wide, hyaline, membranous, scabrous on the wings. *Lower flower* hermaphrodite; anthers ca. 1 mm long; stigmas 2, plumose. *Caryopsis* of the lower anthecium a little smaller than that present in the upper anthecium, 0.8–0.9 mm long, 0.4–0.5 mm wide, free from its lemma and palea. *Upper anthecium* ovoid, 1.3–1.5 mm long, 0.5–0.6 mm wide, stramineous, brown at maturity. *Caryopsis* ovoid, 0.8–1.2 mm long, 0.4–0.6 mm wide, the hilum punctiform to oblong. In flower November to April.

*Distribution.* Costa Rica to Colombia and Venezuela at 650–2,000 m elevation.

*Additional specimens examined.* COSTA RICA. ALAJUELA: Río Grande, cerca de San Ramón, *Brenes* 19683 (NY). SAN JOSÉ: Basin of El General, *Skutch* 4816 (GH, NY). COLOMBIA. Without locality: *Smith* 2571 (GH). VENEZUELA. ARAGUA: slopes of mountainside near stream, between Choroní and Maracay, *Soderstrom* 978 (US);





FIGURE 8. *Panicum irregulare*.—*a*. Leafy branch.—*b*. Ligule.—*c*. Racemose branch.—*d*. Spikelet, lateral view.—*e*. Lower anthecium showing hermaphrodite flower.—*f*. Caryopsis of the lower anthecium, embryo side.—*g*. Caryopsis of the lower anthecium, hilum side.—*h*. Upper anthecium, dorsal view.—*i*. Upper anthecium, ventral side.—*j*. Caryopsis of the upper anthecium, embryo side.—*k*. Caryopsis of the upper anthecium, hilum side. Based on Soderstrom 978 (US).



Parque Nacional Henry Pittier, NW of Maracay, Rancho Grande, *Davidse* 3017 (US).

Although having the diagnostic characters of sect. *Stolonifera*, *P. irregulare* differs by the presence of an hermaphrodite flower in the lower floret, a character unknown elsewhere in the genus. This lower flower develops a normal caryopsis similar to the one present in the upper floret, only a little smaller. Unlike the upper anthecium, in the lower floret the lemma and palea are membranous, and the caryopsis is completely free from these bracts. Pohl (1980) suggested that this species may be a hybrid between genus *Panicum* and *Pseudechinolaena*, but we could find no evidence to support this. As previously stated, the species matches the characters that differentiate sect. *Stolonifera* from the other sections in subg. *Phanopyrum*.

**7. *Panicum latissimum*** Mikan ex Trin., in Sprengel, Neue Entdeck. Pflanzenk. 2: 87. 1821. TYPE: "*Panicum latissimum* Mikan detexit in Brasil et comm. an Mikan, sub cujus nom specium descripsi in Spr. gl. n. Entdx" (holotype, LE, not seen, fragment at US (974701)). Figure 9.

*P. macrophyllum* Raddi, Agrost. Bras. 46. 1823. TYPE: Brazil. Without locality: *Raddi* s.n. (holotype, PI, not seen, fragment at US (80732)).

Robust perennials up to 2.5 m tall. *Culms* decumbent and rooting at the lower nodes to erect, branching at the upper nodes; internodes cylindric, hollow, glabrous, up to 1.5 cm diam.; nodes brown, constricted, glabrous. *Leaf sheaths* 12–14 cm long, striate, stramineous, densely pilose, with long, whitish, caducous hairs or glabrous. *Ligule* membranous-ciliate, small, 0.2–0.3 cm long, external ligule absent. *Leaf blades* 30–35 cm long, 6–12 cm wide, flat, acuminate, glabrous, cordate and amplexicaul basally, the margins conspicuously ciliate to glabrous, the midnerve prominent or not prominent, the lateral nerves anastomosing; *pseudopetiole* brownish, glabrous, 0.6–1.3 cm long. *Panicles* pyramidal, lax and diffuse, many-flowered, 30–

45 cm long, 10–18 cm wide, with alternate, distant, hirsute to scabrous branches diverging from the axis, sometimes with secondary and tertiary branchlets; spikelets short- to long-pedicelled, along the lower side of the branches; axis longitudinally ridged, minutely scabrous, the branches hirsute to scabrous, triquetrous; axils of the branches short- to long-pilose; pedicels pilose. *Spikelets* ellipsoid, acute, 2.7–3.1 mm long, 0.9–1.1 mm wide, stramineous to brownish or purplish, the glumes and lower lemma shortly pilose and scabrous, the upper glume and lower lemma subequal, acuminate, both with long hairs toward the margins. *Lower glume* narrowly ovate, acute, 2.5–2.7 mm long,  $\frac{1}{2}$ – $\frac{3}{4}$  the length of the spikelet, acuminate, shortly pilose to scabrous on the outer surface, densely pilose toward the apex of the inner surface, 5-nerved, the midnerve scabrous. *Upper glume* 2.5–2.9 mm long, 5(–7)-nerved, the midnerve scabrous. *Lower lemma* 2.7 mm long, glumiform, 5-nerved. *Lower palea* elliptic, 1.8–2.3 mm long, 0.6–0.8 mm wide, stramineous, shortly pilose, the margins ciliate; male flower present, the anthers ca. 1.7 mm long. *Upper anthecium* ellipsoid, acute, 2–2.2 mm long, 0.8 mm wide, stramineous. *Caryopsis* not seen. In flower October to April.

*Distribution.* Brazil. In mountains, humid and rocky habitats at 500–1,000 m elevation.

*Additional specimens examined.* BRAZIL. ESPÍRITO SANTO: Município de Alfredo Chaves, Vila São Bento de Urânio, mata higrófila, *Zuloaga et al.* 2410 (RB, SI, US). RIO DE JANEIRO: between Alto Boa Vista and Silvestre, *Chase* 8377 (F, MO, NY, US); vicinity of Paineiras, Corcovado, *L. Smith* 1205 (F, GH, US); Corcovado, *Riedel* 329 (US); without collector, *Oct.* 1836 (R); estrada do Sumaré, *Pabst et al.* 127 (MO); Petrópolis, *Goes & Dionisio* 451 (RB), *Peixoto* s.n. (R); Serra dos Orgãos, perto do Veu das Noivas, *Carauta* 712 (F); Serra dos Orgãos, *Vidal II-5580* (R), *Pereira* 187 (RB); Parque Nacional da Tijuca, Bom Retiro, *Soderstrom et al.* 1855 (US); Bico do Papagaio, *Landrum* 2201 (RB), *Ule* 4158 (R, US); Tijuca, *Chase* 12159 (US), *Oct.* 1883, *Schwacke & Saldanha* s.n. (R); Pico da Tijuca, *Chase* 8486 (US); Estrada da Guanabara, Mata do Sumaré, *Sucre* 1748 (RB); Guanabara, Alto da Boa Vista, *Sucre* 2091 (R); Sumaré, *Sucre* 4071 (RB); Alto da Pedra da Gavea, *Sucre* 4297 (RB); Teresópolis, *Vidal* 18, 374 (R); estrada Teresópolis–Friburgo, Canoas, *Braga* 1532 (RB); Rio de Ja-



neiro, Riedel 464 (R). Without locality: Burchell 1110, 1381, 2158 (US); Gardner 210 (GH, US); Glaziou 504, 6973 (US), 17928 (P, US); Riedel s.n. (P); Gaudichaud s.n. (P).

*Panicum latissimum* is clearly distinguished from other species of sect. *Stolonifera* and from the rest of the genus by having leaves up to 12 cm wide.

**8. *Panicum piauiense*** Swallen, Sellowia 18: 110. 1966. Based on *P. blepharophorum* Mez, Bot. Jahrb. Syst. 56, Beibl. 125: 4. 1921. Not *Panicum blepharophorum* J. S. Presl. TYPE: Brazil. Piauí: without locality, July–Sep. 1839, Gardner 2016 (holotype, BM, not seen, fragment at US; isotypes, GH, NY, P, US). Figure 10.

*Ichnanthus gardneri* Mez, Feddes Rept. Spec. Nov. Regni Veg. Beih. 15: 132. 1918. TYPE: Brazil. Goiás: without locality, 1841, Gardner 3512 (holotype, B, not seen; isotypes, BR, P, fragments at US).

Cespitose, moderately robust, short-rhizomatous perennials, 40–80 cm tall, with conspicuous, fusiform, long root tubers up to 3–5 mm thick, the cataphylls lanate. Culms erect, branching, many-noded, the internodes cylindric, densely to sparsely pilose or glabrous, hollow; nodes brown, constricted, shortly pilose. Leaf sheaths 4–6 cm long, longer than the internodes, stramineous, glabrous or scarcely pilose, one of the margins densely ciliate, with short, whitish hairs, the other glabrous. Ligule membranous-ciliate, 0.5 mm long, sometimes with long hairs toward the back at the base of the blade; external ligule a row of antrorse whitish hairs, the collar stramineous, pilose. Leaf blades lanceolate, 9–13 cm long, 1–1.5 cm wide, acuminate, flat, cordate to subcordate basally, scabrous to densely villous on both surfaces, the adaxial surface shortly pilose at the base, the margins white and cartilaginous, long-ciliate or glabrous basally, otherwise minutely scabrous; pseudopetiole small, shortly pilose. Panicles lax, oblong, 7–22 cm long, 2–4.5 cm wide, with the branches alternate and diverging from the axis, rarely with short,

appressed secondary branchlets; axis longitudinally ridged, sparsely hispid, scabrous, the branches triquetrous, scabrous and sparsely hispid, bearing spikelets in pairs: one subsessile, the other shortly pedicellate, the lower one distant; axils of the branches long-pilose to villous; pedicels pilose or scabrous. Spikelets narrowly ellipsoid, 2.4–2.8 mm long, 0.8 mm wide, stramineous to purplish, sparsely pilose or with long hairs at the margins of the glumes and lower lemma. Lower glume ovate, acuminate, 1.8–2.5 mm long,  $\frac{1}{2}$ – $\frac{3}{4}$  the length of the spikelet, scabrous to sparsely pilose on the outer surface, densely pubescent toward the apex on the inner surface, 3-nerved, the midnerve scabrous. Upper glume acute to acuminate, 2.3–2.7 mm long, pilose to scabrous, with long, stiff and whitish hairs toward the margins on the outer surface, the inner surface shortly pilose, 5-nerved, the midnerve scabrous. Lower lemma glumiform, acute, 2.3–2.6 mm long, 5-nerved, with pubescence similar to that of the upper glume, with or without 2–4 prominent, ocellate and crateriform glands on the middle portion. Lower palea elliptic, 1.7–2 mm long, 0.6 mm wide, stramineous, shortly pilose, the margins ciliate; male flower absent. Upper antheridium narrowly ovoid, 1.7–2 mm long, 0.6 mm wide, stramineous. Caryopsis ellipsoid, 1.3 mm long; hilum oblong. In flower January to April.

*Distribution.* Brazil, in cerrados of Bahia and Piauí at 800 m elevation.

*Additional specimens examined.* BRAZIL. BAHIA: Chapadão do Panair, Serra do Mimo, Black 55-17982 (IAN); Espigão Mestre, ca. 100 km WSW of Barreiras, Anderson et al. 36751 (F, MO, R, US); Serra de Teririco, Gruta do Pequeno, Zehntner 67 (R); Serra do Teririco, Zehntner 3746 (RB, US); Serra do Sincorá, 15–20 km from Andaraí, along the road to Itaeté, Harley et al. 18652 (MO, P).

This species can be mistaken for poorly developed plants of *P. rude*, but the latter normally reaches greater size (2 or 3 m high). *Panicum piauiense* differs further from *P. rude* by having food-storing thickened roots and by having culms that branch from the base up to the upper part of the plant. The



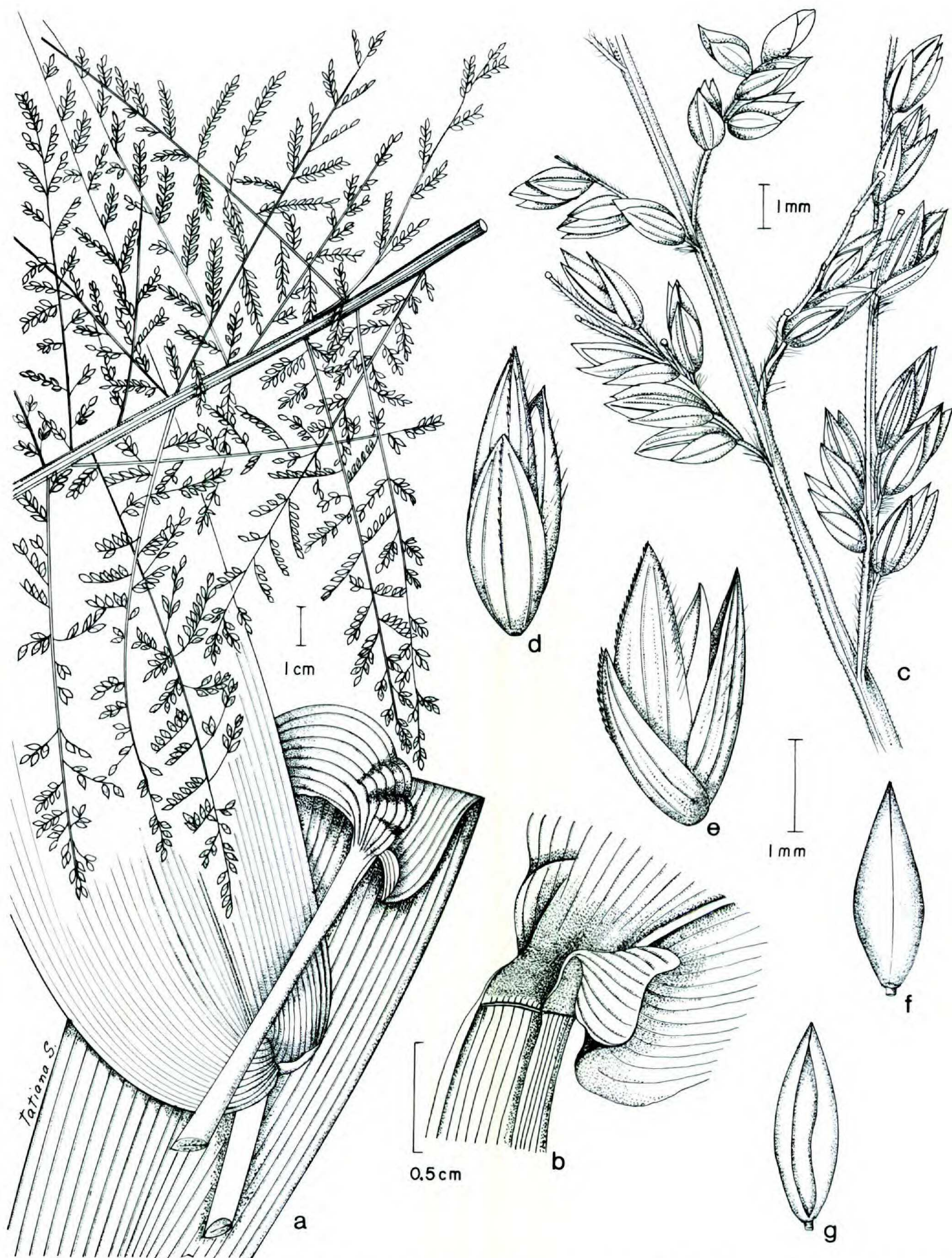


FIGURE 9. *Panicum latissimum*.—a. Blades and portion of the panicle.—b. Ligule.—c. Portion of the panicle showing racemose branches.—d. Spikelet, ventral view.—e. Spikelet, lateral view.—f. Upper anthercium, dorsal view.—g. Upper anthercium, ventral view. Based on Chase 8486 (US).

two species also have different distributions, *P. piauiense* occurring only in Bahia and Piauí, *P. rude* from Espírito Santo to Rio Grande do Sul. The fusiform root tubers of

*P. piauiense* are unique within *Panicum*. Soderstrom (1981) reported tubers in the nonpanicoid grasses *Puelia ciliata* Franch., *Lophatherum gracile* Brongn., *Molinia cae-*



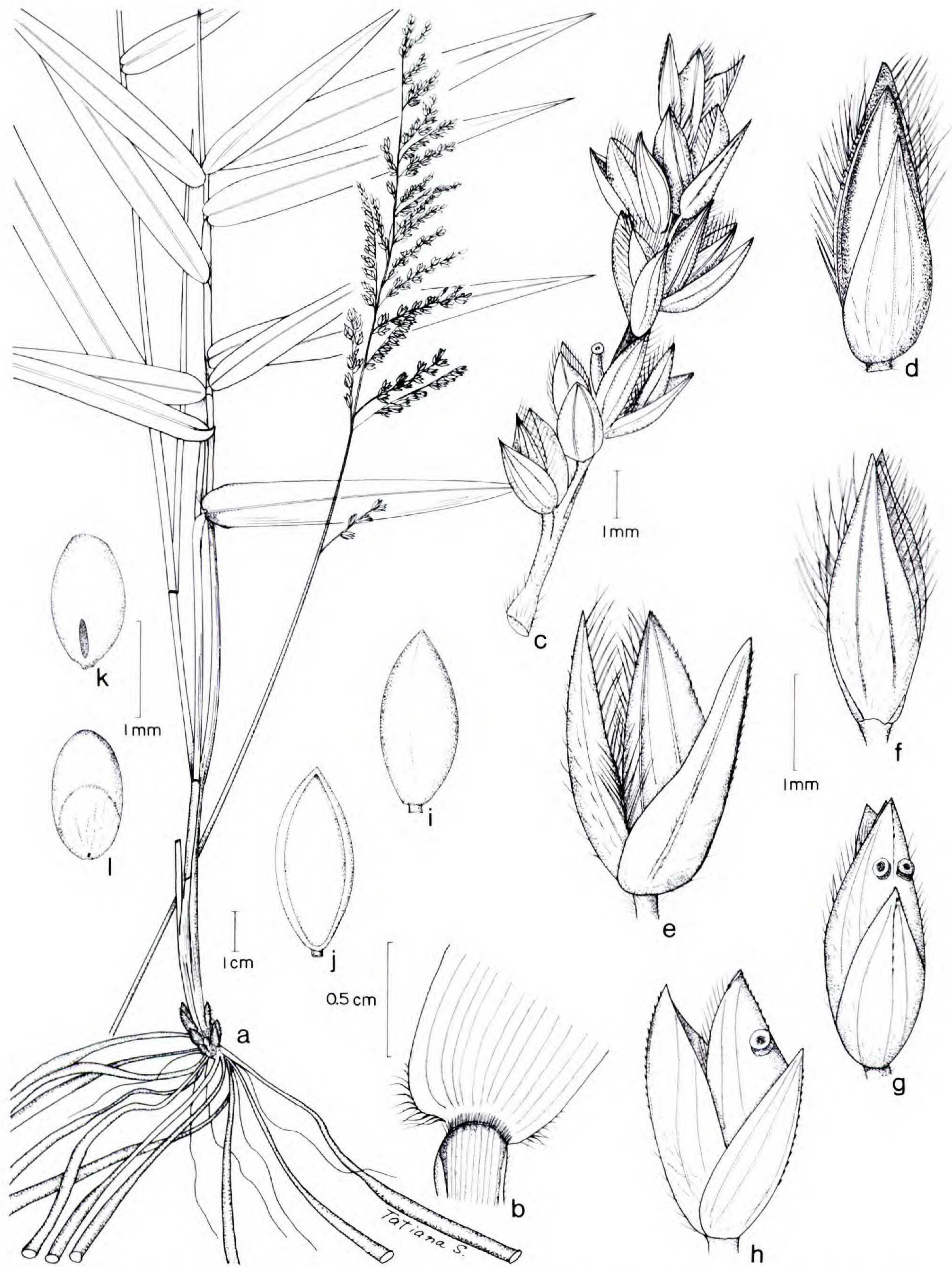


FIGURE 10. *Panicum piauiense*.—a. Habit.—b. Ligule.—c. Detail of a racemose branch.—d. Spikelet, ventral view.—e. Spikelet, lateral view.—f. Spikelet, dorsal view.—g. Spikelet, ventral view, lower lemma with glands.—h. Spikelet, lateral view, lower lemma with glands.—i. Upper antheridium, dorsal view.—j. Upper antheridium, ventral view.—k. Caryopsis, hilum side.—l. Caryopsis, embryo side. a–f, i–l based on Anderson 36751 (US); g, h based on Zehntner 3746 (US).

*rulea* (L.) Moench, and *Sucrea sampaiana* (A. Hitchc.) Soderstrom.

9. ***Panicum pulchellum*** Raddi, Agrost. Bras. 42. 1823. *Eriochloa pulchella*

(Raddi) Kunth, Rev. Gram. 1: 30. 1830. TYPE: Brazil. Rio de Janeiro: in sylvaticis prope Catumby, non procul ad urbe Rio de Janeiro, *Raddi s.n.* (holotype, PI, not seen, fragments at BAA, US). Figure 11.



*P. leptostachyum* J. S. Presl, Rel. Haenk. 1: 311. 1830.  
*Hymenachne leptostachya* (J. S. Presl) Fourn.,  
Mex. Pl. 2: 36. 1886.  
*P. bipustulatum* Schldl., Linnaea 26: 135. 1853.

Probably perennial. *Culms* decumbent, extensively creeping and rooting, geniculate at the lower nodes, then becoming erect, freely branching, 10–65 cm tall; internodes long, compressed, pilose to glabrous; nodes obscure, densely villous with whitish hairs. *Leaf sheaths* 0.7–2.5 cm long, shorter than the internodes, striate, membranous, densely pilose, with long, whitish hairs to glabrous, the margins ciliate. *Ligule* membranous-ciliate, ca. 0.4 mm long, the collar densely pilose. *Leafblades* ovate-lanceolate, acuminate, 2.5–5.5 cm long, 1–2 cm wide, asymmetrical and cordate basally, strigose to glabrous on both surfaces, the basal margins long-ciliate with thick, caducous hairs, otherwise scabrous to ciliate, the abaxial surface often purplish; midnerve prominent, the lateral nerves anastomosing; *pseudopetiole* densely pilose, with long, thick hairs. *Panicles* terminal, 4–18 cm long, 1.5–4 cm wide, short- to long-exserted, the peduncle hispid, formed by 5–20 secund, alternate or occasionally opposite and racemose branches, these distant, ascending or reflexed, divergent from the axis; axis longitudinally ridged, hispid, the branches triquetrous, flattened on one side, densely hispid toward the base, hispid to scabrous on the rest of the surface, with spikelets borne in pairs, one subsessile, the other short-pedicellate (the subsessile spikelet frequently abortive), the axils of the branches pilose. *Spikelets* narrowly ellipsoid, 1.8–2.3 mm long, 0.6–0.7 mm wide, greenish, the glumes and lower lemma hirsute, the hairs papillose, rigid, short; upper glume and lower lemma subequal (or the upper glume shorter), acuminate. *Lower glume* ovate, acute, 0.8–1.1 mm long,  $\frac{1}{3}$ – $\frac{1}{2}$  the length of the spikelet, short-pilose on the middle portion, hirsute toward the margins, separated from the upper glume by an internode, 3-nerved, the midnerve scabrous. *Upper glume* 1.8–2 mm long, 5-nerved, hirsute. *Lower lemma* 1.7–2.1 mm long, 5-nerved, short-pilose on the middle portion and long-pilose toward the margins, bear-

ing 2 crateriform ocellate glands between the midnerve and the 2 immediate lateral nerves, or the glands occasionally absent. *Lower palea* 1.4–1.6 mm long, 0.4–0.6 mm wide, lanceolate, hyaline, short-ciliate at the margins, glabrous in the rest of the surface; male flower usually absent. *Upper antheridium* ellipsoid, acute, 1.2–1.5 mm long, 0.7–0.9 mm wide. *Caryopsis* ellipsoid, 1–1.2 mm long, 0.5–0.6 mm wide; hilum oblong. In flower all year.

*Distribution.* This species occurs from Mexico, Guatemala, Belize, Honduras, Nicaragua, Costa Rica, and Panama to Colombia, Venezuela, Ecuador, Peru, Bolivia, and Brazil. It grows in humid and shaded places from sea level to 2,000 m elevation.

*Chromosome number.*  $n = 10$  (Davidse & Pohl, 1974);  $2n = 20$  (Gould & Soderstrom, 1970; Pohl & Davidse, 1971).

*Selected specimens examined.* BELIZE. EL CAYO: Chalillo crossing, *Lundell* 6513 (F, US); Norris Woods, *Dwyer et al.* 173 (MO). STANN CREEK: Big Creek, *Schipp* 180 (F, GH, MO, NY, US), 884 (GH, MO, NY). TOLEDO: cerca de Jacinto Hills, *Gentle* 5095 (F, US); Swasey Branch, Monkey River, *Gentle* 3962 (F, GH, MO, NY, US); Edwards Road, near Columbia, *Gentle* 6447 (F). Without district: Gracie Rock, Sibun River, *Gentle* 1539 (MO); Pine Ridge, near Manatee Lagoon; *Peck* 279 (GH). BOLIVIA. LA PAZ: Prov. Larecaja, ruta entre Caranavi y Guanay, puente sobre el Río Coroico, *Croat* 51685 (MO); Guanay, *Rusby* 217 (NY, US). BRAZIL. MATO GROSSO: Santa Anna da Chapada, *Malme* 3396 (US). MINAS GERAIS: Viçosa, *Chase* 9445 (GH, MO, NY, US); Pico do Itabira, *Mattos s.n.* (R-38680). RIO DE JANEIRO: Angra dos Reis, *Castellanos* 801 (F); Teresópolis, Serra dos Orgãos, *Sampaio* 2426A (US); matas do Andarahy e Trapicheira, *Kuhlmann s.n.*, Apr. 1917 (R); Parque Nacional Itatiaia, camino al Lago Azul, *Zuloaga et al.* 2367 (RB, SI, US). COLOMBIA. ANTIOQUIA: 26 km al S de Zaragoza, *Denslow* 2651 (MO); vicinity of Planta Providencia, 26 km S y 23 km W air of Zaragoza, in valley of Río Anorí, *Denslow* 2728 (COL), *Denslow* 2651 (COL); Granja de las Mercedes en Venecia, *Barkley & Gutierrez* 637 (COL, US); Tirana Creek, at the confluence with Río Anorí, *Soejarto et al.* 3178 (COL, MO). CHOCÓ: San José del Palmar, cerro al S de la población, *Forero et al.* 3436 (COL, MO). CUNDINAMARCA: Sasaima, vereda San Bernardo, La María, *Barrios* 12573 (COL); Estación Central de Investigación La Esperanza, *Obregón* 19 (COL); en las cercanías del Boquerón de Santa Inés, *Pinto y Bernal* 1603 (COL); Susumuco, *Triana* 789 (COL). MAGDALENA: Santa Marta, *H. H. Smith* 2127 (GH, MO, NY, US); San Sebastián, north of Pueblo Bello, *Angel* 733 (US). META: Los Llanos, 12 km SE of Villavicencio, *Haught* 2531 (COL, F, MO, NY, US); margen derecha del Río Guayabero, caudal de la



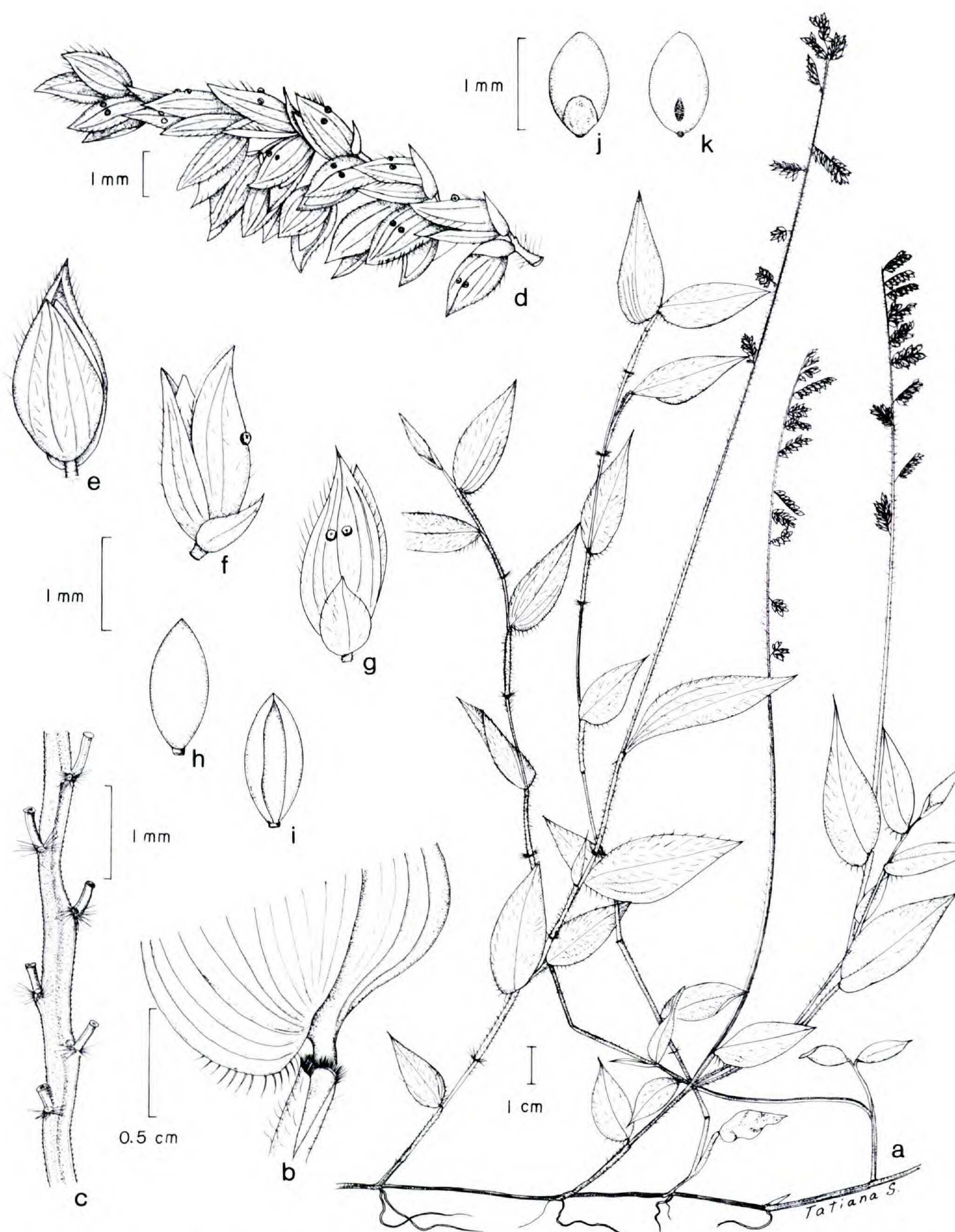


FIGURE 11. *Panicum pulchellum*. —a. Habit.—b. Ligule.—c. Portion of a racemose branch showing pedicels.—d. Racemose branch.—e. Spikelet, dorsal view.—f. Spikelet, lateral view.—g. Spikelet, ventral view.—h. Upper antheridium, dorsal view.—i. Upper antheridium, ventral view.—j. Caryopsis, embryo side.—k. Caryopsis, hilum side. Based on Chase 12421 (US).

Macarena, Pinto y Bischler 344 (P, COL); Villavicencio, Cuatrecasas y García Barriga 4496 (COL, F, US), Triana 14 (COL); Cordillera la Macarena, mesa del Río Sansa, Idrobo & Schultes 1282 (COL); Reserva Nacional de La Macarena, junction of Río Sansa and Río Guejar, Thomas et al. 1426 (COL); valley of Río Tigre, Fosberg 19043

(US). NARIÑO: Ricaurte, von Sneidern A-539 (GH). SANTANDER: Cordillera Este, Mesa de Los Santos, Killip & Smith 15346 (MO, NY, US). NORTE DE SANTANDER: Región del Sarare, Hoya del Río Margua, bosques en la quebrada del Río Negro, Cuatrecasas 12910 (COL, US). VALLE DEL CAUCA: Costa del Pacífico, Río Cajambre, Cua-



*tre Casas* 17090 (F). COSTA RICA. ALAJUELA: San Ramón, *Brenes* 21388 (NY); 8 km al NE de Villa Quesada, *Molina et al.* 17181 (F). CARTAGO: 5 km al N de El Muñeco, *Pohl & Davidse* 11696 (F); 5 km al NE de Paraíso, *Pohl* 12793 (MO, NY); cercanías de Pejivalle, *Skutch* 4616 (F, GH, MO, US). HEREDIA: banks of Río María Aguilar, *Godfrey* 66533 (US); valle del Río Sarapiquí, E de La Virgen, *Pohl* 12827 (MO, NY). PUNTARENAS: 1 km al N de la Carretera Interamericana, *Pohl & Davidse* 11605 (F). SAN JOSÉ: environs de Buenos Aires, *Tonduz* 4881 (US); vicinity of La Verbena, *Standley* 32232 (US); vicinity of El General, *Skutch* 2214 (GH, NY, US), 3874 (GH, MO, NY, US); El General, *Skutch* 3890 (GH, MO, NY, US); San Antonio de Desamparados, *Pohl & Lucas* 12992 (MO). ECUADOR. AZUAY: entre el Río Gamolotay y el Río Ñorçay, *Steyermark* 52886 (F). CHIMBORAZO: Sibambe, *Acosta Solís* 5338 (F, US), 5339 (US). GUAYAS: Teresita, 3 km W of Bucay, *Hitchcock* 20536 (NY, US). IMBABURA: entre El Pajón y Cachaco, *Acosta Solís* 12709 (US). EL ORO: between La Choluta and Portobello, *Hitchcock* 21212 (NY, US). NAPO PASATAZA: Tena, *Asplund* 8871 (US). PICHINCHA: Santo Domingo de los Colorados, *Asplund* 16416 (NY, R, US), *Acosta Solís* 10883 (F, US). Junction of the provinces of Guayas, Cañar, Chimborazo, & Bolívar: near the village of Bucay, *Camp* 3819 (GH, NY, US); Bucay, *Rose* 22446 (NY, US). GUATEMALA. ALTA VERAPÁZ: near Secanquím, *Mason* 3153 (US); Cubilquitz, *von Tuerckheim* 7702 (US). IZABAL: Los Amates, *Kellerman* 7585 (F, NY); N of Quiriguá, *Weatherwax* 92 (US); near Quiriguá, *Standley* 23709 (F, GH, MO, US), 24246 (GH, MO, NY, US). PETÉN: Lancandón, *Contreras* 3340 (GH, US); La Libertad, *Aguilar* 185 (MO, US), *Lundell* 2120 (US), 2545 (GH, US); Río Pasión, 4 km NE of Puste, *Lundell* 18099 (GH). QUEZALTENANGO: between Finca Pirineos and Patzulín, *Standley* 86608 (F, US); El Palmar, *Kellerman* 6246 (F, US). RETALHULEU: Río Coyote, *Standley* 87445 (F). SANTA ROSA: La Joya de Limón, E of Cuilapa, *Standley* 78309 (US); near El Molino, *Standley* 78429 (F, US). TEXACAPA: 13 km al E de Lobo, *Harmond & Fuentes* 1854 (MO). HONDURAS. ATLÁNTIDA: Cutiapa, 26 km E de Las Ceibas, *Nelson et al.* 3412 (MO); Lancetilla, *Pohl & Davidse* 12072 (MO). CORTÉS: along Río Lindo, N of lake Yopoa, *Morton* 7894 (F). EL PARAÍSO: Pueblo de Agua Fria, *Molina* 7642 (US). MORAZÁN: Río Yeguaré, *Molina* 1374 (MO). OLANCHO: Jutiapa forest camp, near Salamá, *Pohl & Gabel* 13746 (F); vicinity of Juticalpa, *Standley* 17863 (F); between Catacamas and La Presa, *Standley* 18307 (F). YORO: Ciudad de Yoro y alrededores, *Nelson* 1989 (MO). MEXICO. CHIAPAS: Campo Experimental de Quina, *Vera Santos* 2731 (US); near the junction of Río Perlas and Río Jataté at San Quintín, near Laguna Miramar, *Sohns* 1652 (US), *Breedlove* 33374 (F, NY). OAXACA: vicinity of Cafetal Concordia, *Morton* 2374 (US); San José Chiltepec, *Schultes & Reko* 527 (US); Yaveo, *Mexía* 9134 (GH, MO, NY). TABASCO: Hacienda Mayito, *Rovirosa* 323 (NY). VERACRUZ: Córdoba, *Hitchcock* 6444 (US); Valle de Córdoba, *Bourgeau* 1455 (GH, US). NICARAGUA. CHONTALES: Santo Tomás, *Seymour* 2753 (F, GH, NY); Santo Domingo, *Seymour* 3382 (F, GH, NY). JINOTEGA: N of Jinotega, *Williams et al.* 27411 (F). MATAGALPA: Cordillera Central de Nicaragua, 5 km N of Matagalpa, *Williams et al.* 23740 (F, NY, US). ZELAYA: a lo largo del Río Grande, *Molina* 2260 (F, GH, US); near El Recreo, *Standley* 19570 (F). PAN-

AMA. CHIRIQUÍ. San Bartolo, 19 km W de Pto. Armuellos, *Busay* 610 (F, MO). COLÓN: Canal Zone, Mount Hope Cemetery, *Standley* 28824 (US); Canal Zone, cerca de Culebra, *Pittier* 2226 (US); near Fort Sherman, *Standley* 31045 (US); Barro Colorado Island, trail at rear 8, *Croat* 7436, 13150 (MO); Canal Zone, Quebrada Bonita, *Steyermark & Allen* 17157 (US); Canal Zone, between France field and Catival, *Standley* 30176 (US). PANAMÁ: E of the Río Tacumén, *Standley* 26554 (US); Río Tapia, *Hitchcock* 22945 (F, R. US); Altos de Campana, *Méndez* 179 (MO); sabana near Chepo, *Hunter & Allen* 54 (GH, US); Archipiélago Perlas, San José Island, *Erlandson* 170 (NY, US), *I. Johnston* 1136 (GH, US), 1274 (GH). PERU. AYACUCHO: Estrella, between Huanta and Río Apurímac, *Killip & Smith* 30699 (US). LORETO: Yurimaguas, *Anderson* 84 (US). CUZCO: Pilcopata, Santa Inés, *Vargas* 11315 (US); without locality, 5 May 1930, *Bues s.n.* (F-659976, US). VENEZUELA. AMAZONAS: Isla Carestía, 5 km NNW of Sanariapo, *Davidse* 2862 (MO, US); edge on Isla Carestía, saltos Carestía y Gallo, 5 km N of Sanariapo, *Maguire et al.* 36162 (NY, US). ANZOÁTEGUI: Fila El Guácharo, *Davidse & González* 19422 (MO); cafetales al NW de Buenos Aires, 18 kms aéreos al NE de Bergantín, *Davidse & González* 19632 (MO). ARAGUA: 12 km S of Alto de Choroni, *Davidse* 3078 (MO); Cordillera Interior, entre el Paují y el Socorro, *Steyermark* 118086 (MO). DISTRITO FEDERAL: Cotiza, *Chase* 12421 (US). LARA: Distrito Jiménez, Parque Nacional Yacambú, *Davidse & González* 20980 (MO, US); Terepaima, Barquisimeto, *R. Smith* V186 (US). MÉRIDA: 2 km del Río Guaymaray, *Liesner & González* 10623 (MO). MIRANDA: Guinand Estate, *Pittier* 5975 (NY, US); Los Teques, *Chase* 12303 (NY, US), *Archer* 3055 (US). PORTUGUESA: between Aparición and Acarigua, *Pittier* 12086 (US). SUCRE: without locality, *Tamayo* 2152 (US). TÁCHIRA: Fila de Paramito, al N de Mesa del Tigre, *Davidse & González* 22482 (MO); cerro Las Minas, *Steyermark et al.* 119937a (VEN). YARACUY: Cerro La Chapa, 7 km N of Nirguá, *Davidse et al.* 20809 (MO).

**10. *Panicum rude*** Nees, Agrost. Bras. 158. 1829. TYPE: Brazil. Minas Gerais: habitat in marginibus sylvarum Districtus Adamantum prope Milho verde, *Martius s.n.* (holotype, M, not seen, fragments at BAA, US). Figure 12.

- P. bambusaefolium* Desv., Opusc. 83. 1831. TYPE: Brazil. Without state and locality: *Desvaux s.n.* (holotype, P; fragments at BAA, US).
- P. secundum* Trin., Spec. Gram. 3: pl. 324. 1836. *P. secundum* var. *secundum* (as 'subaequiglume') Doell, in C. Martius, Fl. Bras. 2(2): 194. 1877. TYPE: Brazil. Without locality: *Riedel s.n.* (holotype, LE, not seen, fragment at US; isotypes, P, US).
- P. secundum* var. *inaequiglume* Doell, in C. Martius, Fl. Bras. 2(2): 194. 1877.
- P. semitectum* Swallen, Sellowia 18: 112. 20 Dec. 1966. Not *Panicum semitectum* Swallen, Phytologia 14: 68. 5 Dec. 1966. TYPE: Brazil. Paraná: Jaguariaíba, in woods, overhanging on bank, 25 Feb. 1946, *Swallen* 8675 (holotype, US).





FIGURE 12. *Panicum rude*.—a. Portion of a culm and panicle.—b. Ligule.—c. Detail of a racemose branch.—d. Spikelet, ventral view.—e. Spikelet, lateral view.—f. Spikelet, ventral view, lower lemma with glands.—g. Upper antheridium, dorsal view.—h. Upper antheridium, ventral view.—i. Caryopsis, embryo side.—j. Caryopsis, hilum side. f based on Riedel s.n. (US-974743); a–e, g–j based on Sendulsky 1039 (US).

- P. pompale* Swallen, Sellowia 18: 110. 1966. TYPE: Brazil. Rio de Janeiro: top of sheer face of Corcovado, Rio de Janeiro, 11 Jan. 1925, Chase 8165 1 (holotype, US).

*P. kleinii* Swallen, Sellowia 18: 111. 1966. TYPE: Brazil. Santa Catarina: Pinhal da Companhia, Lauro Muller-Urussanga, 23 Aug. 1958, Reitz & Klein 7043 1 (holotype, US).
- P. albospiculatum* Swallen, Sellowia 18: 110. 1966. TYPE: Brazil. Santa Catarina: Rio Caçador, 22 Jan. 1946, Swallen 8291 (holotype, US).

*P. apricum* Swallen, Sellowia 18: 112. 1966. TYPE: Bra-



zil. Santa Catarina: Campo dos Padres, 16 Nov. 1956, *Smith, Reitz & Klein* 7643 (holotype, US; isotype, NY).

Robust, caespitose, short-rhizomatous perennials. *Culms* decumbent and rooting at the lower nodes to erect or leaning among branches of trees, 60–200(–300) cm tall, usually simple, the internodes cylindric, glabrous, hollow; nodes obscure, compressed, glabrous. *Leaf sheaths* 7–20 cm long, longer than the internodes, stramineous, auriculate, striate, papillose-pilose with caducous hairs to densely or sparsely hispid with whitish and appressed hairs, otherwise completely glabrous, the margins pilose to glabrous. *Ligules* membranous-ciliate, 0.5–2.5 mm long; external ligule conspicuous, similar to the inner ligule but smaller; collar brown, pilose to glabrous. *Leaf blades* lanceolate to long-lanceolate, acuminate, flat, 15–45 cm long, 1.6–5 cm wide, cordate to subcordate basally, hispid on both surfaces with appressed short hairs to glabrous, the margins scabrous, ciliate or glabrous; *pseudopetiole* brownish, 0.5–1 cm long and with ciliate margins. *Panicles* lax, pyramidal to oblong, many-flowered, 20–65 cm long, 5–25 cm wide, with secund branches alternate to subopposite, diverging toward the base of the panicles and contracted toward the apex, the spikelets short-pedicelled and disposed in pairs in the branches; axis longitudinally ridged, scabrous to densely hispid; branches and branchlets longitudinally ridged, scabrous and long- to short-pilose, the axils of the branches brownish, shortly pilose; pedicels scabrous, sometimes with long hairs. *Spikelets* ellipsoid, 2.3–3 mm long, 0.8–1.1 mm wide, stramineous or nearly purplish, the glumes and lower lemma sparsely to densely pilose, upper glume and lower lemma subequal and longer than the upper antheridium. *Lower glume* shortly pilose on both surfaces, acute, 1.4–2.5 mm long,  $\frac{1}{2}$ – $\frac{3}{4}$  the length of the spikelet, 3(–5)-nerved, the nerves anastomosed apically, the midnerve markedly scabrous. *Upper glume* 5(–7)-nerved, acute to acuminate, scabrous, pilose toward the margins and the base or with whitish hairs on the entire surface. *Lower lemma* 5(–7)-nerved,

acute to acuminate, with pubescence similar to that of the upper glume, occasionally with one pair of glands on the middle portion. *Lower palea* lanceolate to elliptic, 1.8–2.5 mm long, 0.6–0.7 mm wide, hyaline, with long-ciliate margins; male flower present or absent. *Upper antheridium* ellipsoid, 1.7–2.3 mm long, 0.6–0.8 mm wide, stramineous to brownish at maturity. *Caryopsis* ovoid, light brown, 1.4–1.7 mm long, 0.8–1 mm wide; hilum oblong. In flower September to April.

*Distribution.* Brazil. Common in interior or edges of forests at 0–1,900 m elevation.

*Common names.* Papanduva, capim-papanduva, papua, capim papua, cana-de-macaco (*Smith et al.*, 1982); capim de anta (*Pereira* 2281).

*Additional specimens examined.* BRAZIL. DISTRITO FEDERAL: 10 km NW of Planaltinha, *Irwin et al.* 13196 (MO, US). ESPÍRITO SANTO: Vargem Alta, San José de Fruteira, *Pereira* 2281 (US). MINAS GERAIS: Serra do Gongo Socco, *Hoehne* 4898 (US); Serra do Espinhaço, 12 km W of Barão de Cocais, *Irwin et al.* 29321 (MO, NY); Serra de Ouro Preto, *Magalhaes Gomez* 2821 (US); Serra do Espinhaço, 35 km E of Belo Horizonte, *Irwin et al.* 30390 (MO, NY); Serra do Espinhaço, Pico do Itambé, *Anderson et al.* 35723, 35894 (MO); Ouro Preto, *Pires & Black* 3375 (US); Araponga, *L. Bailey* 1094 (US); Itacolumy, *Chase* 9420 (F, NY, US). PARANÁ: Curitiba, *Swallen* 8594 (US); Banhado-Piroquara, *Swallen* 8644 (US); Paredão da Santa, *Hatschbach* 35468 (MO); Fazenda Monte Alegre, Rio Harmonia, *Hatschbach* 3027 (SI); Serra Capivari Grande, *Hatschbach* 22959 (NY, US); Jaguariaiva, *Dusén* 13233 (NY, US), 15920 (MO); Rio Iguaçu, Salto Grande, *Hatschbach* 14934 (US); Bagny, *Dusén* 15765 (F, MSC); Jacaré, *Dusén* 17012 (F). RIO DE JANEIRO: Corcovado, *Chase* 8165 II (NY, US); Pão de Açúcar, *Chase* 10043 (US). RIO GRANDE DO SUL: Cambará do Sul, Jan. 1972, *Normann et al.* s.n. (US-2635110); Cambará, serra da Pedra, *Rambo* 36751 (US). SANTA CATARINA: 4 km S of Campo Alegre, *Smith & Klein* 7344 (US); Pinhal da Companhia, Lauro Muller-Urussanga, *Reitz & Klein* 7043 II (US); Campo dos Padres, *Reitz* 2638 (US); Azambuja, *Reitz* 2213 (US); Jordão, Governador Celso Ramos, *Klein & Bresolin* 9772 (US); Serra da Boa Vista, S. José, *Reitz & Klein* 10197 (US); Alto Matador, Rio do Sul, *Reitz & Klein* 7269 (US); Morro do Ribeirão, *Klein* 6924 (US), *Klein & Bresolin* 7647 (US); between Fazenda Santo Antonio and the falls of Rio Canoas, Campo dos Padres, *Smith & Klein* 7871 (NY, US); Itajaí, Morro da Ressacada, *Klein* 1775 (NY, US); Porto União, *Orth* 2510 (US); Pilões, *Reitz & Klein* 2456, 2762 (US), 3630 (NY, US); Brusque, *Reitz* 3547 (F, SI); Blumenau, mata da Companhia Hering, Bom Retiro, *Reitz & Klein* 9190 (NY, US), 9220 (NY); base of Morro do Funil, *Smith & Klein* 15470 (R, US); Sabiá, *Klein* 2252 (NY, US), 2271 (US); Pin-



heiral, *Smith & Reitz* 8750 (US); Morro do Cambirela, *Klein & Bresolin* 9714 (US); Morro da Bateia, *Reitz* 1907 (US); Biturina, *L. Emygdio* 693 (R). SÃO PAULO: São Paulo, Parque do Estado, grounds of the Instituto de Botânica, *Davidse* 10510 (MO), *Hoehne* 27202 (F, NY, US), *Sendulsky* 278, 417, 1039 (SP, US), *Skvortzov* 157 (SP, US); Igaratá, 1 Mar. 1939, *Gehrt s.n.* (US); Parque Estadual das Fontes do Ipiranga, *da Silva* 258 (MO).

The polymorphous nature of *Panicum rude* lies behind its numerous descriptions under different names. Its pilosity is variable on the vegetative and floral parts, with leaf sheaths, leaf blades, and inflorescences varying from densely pilose with different types of pubescence to glabrous.

The spikelets can be densely pilose on the glumes and lower lemma to glabrescent (only minutely scabrous on the glumes). The lower glume varies from  $\frac{1}{2}$  to about  $\frac{4}{5}$  the length of the spikelet, even in the same specimen (as for example in *Irwin et al.* 29321).

The crateriform glands on the middle portion of the lower lemma may be present or absent on the same specimen, but they are most often absent. These glands are present in the type specimens of "*P. bambusaefolium*" and "*P. secundum*," and they occur in *Irwin et al.* 13196. In the voluminous recently collected material in the Instituto de Botânica of São Paulo studied by T. Sendulsky, glands were not detected.

The illustration of *P. secundum* in Trinius (1836, pl. 324) draws attention to the peculiar one-sided position of the leaves. *Panicum rude* grows mostly at the borders of forests; when the culms develop in more or less open and uniformly lighted areas, they bear leaves distichously or alternately arranged. On the other hand, when the culms grow at forest margins and lean against dense vegetation, they receive light only from one side, which promotes unilateral arrangement of the leaves due to the twisting of the culm (Fig. 12).

Swallen (1966) treated five species closely related to *P. rude* within the Latissima group. The characters used by Swallen to separate these species were mainly pubescence of the leaf sheaths and blades and the sizes of plants

and spikelets. We conclude that these characters do not justify separation of species.

Swallen cited *Chase* 8165 as type of "*P. pompale*" and *Reitz & Klein* 7043 as type of "*P. kleinii*." It should be noted that these specimens are divided into two sheets each: *Chase* 8165 I, *Chase* 8165 II, *Reitz & Klein* 7043 I, and *Reitz & Klein* 7043 II. In both cases, *Chase* 8165 I and *Reitz & Klein* 7043 I contain the upper portion of a culm (including the panicle), and *Chase* 8165 II and *Reitz & Klein* 7043 II contain the vegetative part of the plant only. Consequently, *Chase* 8165 I and *Reitz & Klein* 7043 I should be considered as holotypes of the two names.

**11. *Panicum soderstromii*** Zuloaga & Sendulsky, sp. nov. TYPE: Brazil. Bahia: Município de Mucujê, 3 km ao S de Mucujê, na estrada para Jussiape, 1,000 m de alt., 13°00'S, 41°24'W, campo rupestre, 26 July 1979, S. A. Mori, R. M. King, T. S. dos Santos & J. L. Hage 12652 (holotype, CEPEC; isotype, MO). Figure 13.

Gramen probabiliter perenne (basis non visa), 45–95 cm altum, culmis erectis, caespitosis, cylindricis, pilosis. Foliorum vaginæ internodis superantie, sparse et longe pilosae, basilitex pilis papillosis instructae. Ligula brevissima, membranacea, arcuatae, breviter ciliata. Foliorum laminae anguste lanceolatae, acutae, 2–13 cm longae, utrinque breviter pilosae, basibus angustis, truncatis, marginibus rotundatis. Paniculae terminales, racemosae, pyramidales, effusae, 8–18 cm longae, 2–3(–4.5) cm latae; ramis adscendentibus. Spiculae late ellipticae, plerumque hiantae, 2–2.8 mm longae, 1–1.5 mm latae, stramineae vel violaceae; gluma inferior ovata,  $\frac{1}{2}$ – $\frac{3}{4}$  longitudinis spiculae aequans, 3-nervis, pilis longis, albis, ad apicem, crassis; gluma superior acuta, spiculae subaequans, 3–5-nervis, marginibus subtiliter ciliatis. Anthoecium inferum: lemma ovatum, spiculam aequans, 5-nerve, marginibus subtiliter ciliatis, 2–4 glandulis crateriformibus, ocellatis, infra apicem sitis; palea acuta, ad apicem pilosa. Anthoecium superum ellipsoideum, stramineum, atrofusum ad fructus maturitatem. Caryopsis ellipsoidea, 1.5 mm long, 1 mm lata, succinea; hilum ovatum sub-basale; embryo longitudine ca.  $\frac{1}{3}$  caryopsis aequans.

Cespitose, rather robust probable perennial, 45–70(–95) cm tall (base not seen), the lower nodes covered with small, pubescent sheaths. Culms erect, branching at the median and upper nodes; internodes cylindric, hard, solid or hollow, pilose, striate, the nodes





FIGURE 13. *Panicum sodestromii*.—a. Leafy stems.—b. Ligule.—c. Portion of a branch showing pedicels.—d. Racemose branch.—e. Spikelet, ventral view.—f. Spikelet, lateral view.—g. Spikelet, dorsal view.—h. Spikelet, ventral view, lower lemma with two pairs of glands.—i. Spikelet, lateral view, lower lemma with two pairs of glands.—j. Upper antherium, dorsal view.—k. Upper antherium, ventral view.—l. Caryopsis, embryo side.—m. Caryopsis, hilum side. Based on Mori et al. 12652 (MO).

dark, constricted, pilose. *Leaf sheaths* longer than the internodes, slightly auriculate, tightly embracing the culms, with long, papillose, pilose hairs; the lower sheaths approximate,

short. *Ligule* membranous-ciliate, ca. 0.5 mm long; collar area densely pubescent, dark. *Leaf blades* long-lanceolate, 2–13 cm long, 0.7–1.3 cm wide, stiff, attenuate toward the apex,



a little narrowed and truncate basally, with rounded margins, velutinous on both surfaces; the midnerve not prominent; the basal leaves ca. 2–3 cm long, smaller than the uppermost leaves; *pseudopetiole* short. *Panicles* terminal, pyramidal, 8–18 cm long, 2–3(–4.5) cm wide, with numerous, many-flowered, upwardly appressed or spreading racemose branches bearing spikelets in pairs on unequal pedicels; axis glabrous, longitudinally ridged, finely hispid along the ridges; axils of the branches slightly swollen, dark brown, pilose; pedicels with 2 or 3 papillose-pilose whitish and thickened hairs, these longer than the spikelet. *Spikelets* broadly ellipsoid, 2–2.8 mm long, 1–1.5 mm wide, laterally compressed, usually gaping, stramineous or purplish. *Lower glume* ovate, acute, 3-nerved,  $\frac{1}{2}$ – $\frac{3}{4}$  the length of the spikelet, with a tuft of long, white, papillose-pilose hairs at the apex, otherwise scaberulous. *Upper glume* ovate, acute, 3–5-nerved, a little shorter than the lower lemma, finely ciliate at the margins, otherwise scaberulous. *Lower lemma* ca. 2 mm long, ca. 1 mm wide, 5-nerved, finely ciliate at the margins, otherwise scaberulous, with 2–4 crateriform, ocellate glands; the inner surface pilose. *Lower palea* acute, finely pilose at the apex and scabrid at the keels; male flower present, anthers 0.8–1.1 mm long. *Upper antheridium* ovoid, 1.1–1.4 mm long, 0.4–0.7 mm wide, stramineous or dark brown at maturity, smooth, shining. *Caryopsis* broadly ovoid, ca. 1.5 mm long, 1 mm wide, amber; hilum ovate, sub-basal; embryo ca.  $\frac{1}{3}$  the length of the caryopsis. In flower July to September.

*Distribution.* Brazil. Bahia, on rocks, in open and sunny habitats on “campo rupestre” at 1,000 m elevation.

*Paratypes.* BRAZIL. BAHIA: Serra da Jacobina, Andrade-Lima 70-6159 (IPA, SP); Morro do Chapéu, 1,000 m, E. Pereira 2138 (RB, US); Jacobinas, Serra do Brite, 11°09'S, 40°01'W, H. P. Bautista & R. P. Orlandi 1000 (HRB, US).

The number of glands is generally constant for the same individual, two or four. Sometimes there is a third pair of rudimentary

glands. This species is related to *P. chapadense* Swallen, from which it differs mainly by having hairs on the pedicels, pilose lower glumes (with long hairs toward the apex), and smaller spikelets.

None of the specimens was collected with its base, so it is not possible to know if cormlike bases as found in *P. chapadense* are present in the new species.

We have the pleasure of naming this species in honor of the late Dr. Thomas R. Soderstrom, our friend, colleague, and renowned North American agrostologist.

**12. *Panicum stoloniferum* Poiret, Encycl. Meth. Suppl. 4: 272. 1816. TYPE:** French Guiana. Cayenne: Cayenne, without collector (isotype, P, fragment at US). Figure 14.

- P. frondescens* G. Meyer, Prim. Fl. Esseq. 56. 1818. TYPE: Guiana: in graminosis umbrosis insulae Arcuabisch, Meyer s.n. (holotype not located; fragment of an isotype at US (79732)).
- P. olyraefolium* Raddi, Agrost. Bras. 43, pl. 1, fig. 6. 1823. TYPE: Brazil. Rio de Janeiro: in viciniis Rio Janeiro, Raddi s.n. (holotype, PI, not seen, fragment at US).
- P. ctenodes* Trin., Spec. Gram. 2: tab. 171. 1829.
- P. ctenodes* var. *major* Trin., Spec. Gram. 2: tab. 171a. 1829. *P. stoloniferum* var. *major* (Trin.) Kunth, Distr. Meth. Gram. 2: 389. 1831. Not Rev. Gram. 1. tab. 108. 1830.
- P. trichoclados* C. Reichb. ex Kunth, Enum. Pl. 1. 89. 1833. nom. nud.
- P. brachyclados* C. Reichb. ex Trin., Mem. Acad. Imp. Sci. Saint Petersburg VI. 1: 251. 1834. nom. nud.
- P. leprieurii* Steudel, Syn. Pl. Glum. 1: 65. 1854. TYPE: French Guiana. Cayenne: Cayenne, 1835, Leprieur s.n. (syntype, P, fragment at US). Surinam. Without locality: Kappler 1500 (isosyntypes, MO, US).
- P. kegelii* Steudel, Syn. Pl. Glum. 1: 65. 1854.
- P. umbrosum* Salzm. ex Steudel, Syn. Pl. Glum. 1: 65. 1854. nom. nud.

Stoloniferous perennials. *Culms* geniculate, long, decumbent, rooting and branching at the lower nodes, then becoming erect; erect portion of the culms 10–60 cm tall (reaching 1 m tall according to herbarium labels); internodes cylindric to compressed, hollow, branching at the middle and upper nodes, hispid in a longitudinal line to glabrescent, stramineous, sometimes purplish; nodes obscure, constricted, sparsely pilose to glabrous. *Leaf sheaths* splitting, striate, stramineous,



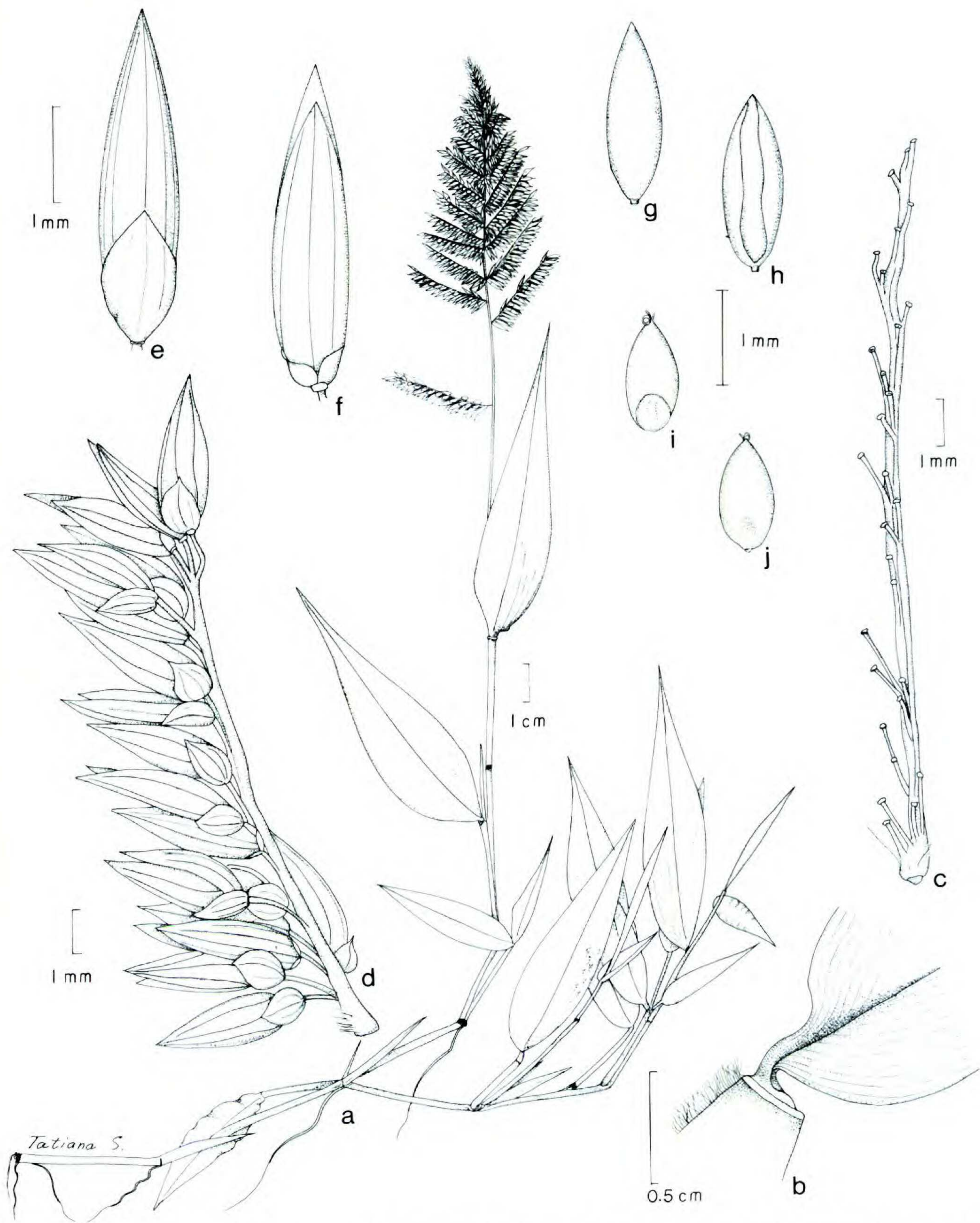


FIGURE 14. *Panicum stoloniferum*.—a. Habit.—b. Ligule.—c. Racemose branch showing pedicels.—d. Racemose branch.—e. Spikelet, ventral view.—f. Spikelet, dorsal view.—g. Upper antheridium, dorsal view.—h. Upper antheridium, ventral view.—i. Caryopsis, embryo side.—j. Caryopsis, hilum side. Based on Burkart et al. 26833 (US).

shorter than the internodes, sparsely pilose to glabrous, the upper margins ciliate, the lower margins membranous. *Ligule* membranous, short, 0.2–0.4 mm long, laciniate at the apex; external ligule conspicuous, formed by a row of dense, whitish hairs. *Leaf blades*

ovate-lanceolate to lanceolate, flat, 1.5–13 cm long, 0.3–3.5 cm wide, acuminate, contracted and asymmetrical basally, shortly pilose to minutely scabrid or glabrous on both surfaces (with long hairs toward the base or glabrous), the abaxial surface mostly purplish,



the midnerve prominent, the lateral nerves usually anastomosing; *pseudopetiole* dark, shortly pubescent. *Panicles* exserted, (1.5–) 4–9(–22) cm long, (0.8–) 1.5–3(–6) cm wide, formed by numerous, dense, spikelike, alternate to subopposed racemose branches,  $\pm$  divergent from the axis, the spikelets borne in pairs, densely congested along the lower side of the branches; peduncles hispid to glabrous; axis longitudinally ridged, hispid to scabrous or glabrous; axis of the branches triquetrous (one side flat), scabrous to glabrous, the axils shortly and densely pilose; pedicels short, 0.5–1 mm long, pilose to glabrous. *Spikelets* lanceolate, 2.2–3.2 mm long, 0.5–0.8 mm wide, glabrous, dark green, the upper glume shorter than the lower lemma, occasionally subequal. *Lower glume* ovate, 0.7–1.3 mm long, glabrous,  $\frac{1}{3}$  the length of the spikelet, 3-nerved, the midnerve scabrous. *Upper glume* gibbous, acute, 1.9–2.8 mm long, 5(–7)-nerved, the midnerve scabrous or glabrous apically. *Lower lemma* acuminate, 2.4–3 mm long, 5(–7)-nerved, the midnerve scabrous. *Lower palea* elliptic, 1.4–1.9 mm long, 0.3–0.5 mm wide, brownish, glabrous, the margins finely ciliate to glabrous; male flower absent. *Upper antheridium* ellipsoid, 1.3–1.9 mm long, 0.4–0.6 mm wide, stramineous, brownish at maturity; lemma 5-nerved; anthers brown, 0.5 mm long. *Caryopsis* ellipsoid, 1–1.5 mm long, 0.5–0.8 mm wide; hilum oblong. In flower all year.

**Distribution.** A widely distributed species found in Mesoamerica, Lesser Antilles, and South America, from Colombia to Argentina. The plants form dense and weedy ground vegetation in the moist and shaded forests at 150–1,400 m elevation.

**Common names.** Capim-do-Mato, capim-do-brejo (Smith et al., 1982).

**Representative specimens examined.** ARGENTINA. CHACO: Isla Soto, *Burkart et al.* 30688 (RB, SI, US), *Schinini* 16130 (MO, SI); Resistencia, *Meyer* 366 (SI). ENTRE RIOS: Isla Curuzu-Chalí, *Burkart et al.* 26833 (SI, US), 26851 (SI). CORRIENTES: 42 km E de Ituzaingó, Puesto de Prefectura, *Zuloaga et al.* 620 (SI); Isla Apipé Grande, Puerto San Antonio, *Krapovickas et al.* 23850 (CTES, US). FORMOSA. Colonia Clorinda, *Venturi* 9164

(US). MISIONES: Posadas, *Ekman* 623 (US); Eldorado, selva a orillas del Paraná, *Burkart* 14528 (SI, US), *Cabrera et al.* 28875 (SI, US); Puerto Rico, *Cabrera et al.* 28803 (SI); Campo Grande, *Montes* 10780 (SI); San Antonio, *Montes* 7063 (SI); San Juan, *Montes* 15308 (SI); Santa Ana, *Montes* 15278 (MO, SI); Arroyo Piray-Guazú, *Cabrera et al.* 28875 (SI); Santa Ana, *Rodriguez* 676 (F, SI, US); entre Pto. Aguirre y Pto. Iguazú, *Wolffhugel & Van de Venne* 37 (SI). SANTA FE: Puerto Piracuacito, *Lewis* 946 (SI, US). BELIZE. EL CAYO: Retiro, *Lundell* 6314 (F, NY, US). TOLEDO: Upper Jacinto Creek, *Gentle* 5276 (US); beyond San Antonio, *Gentle* 7552 (US). BOLIVIA. BENI: vicinity of Chacobo village Alto Ivón, *Boom* 4086 (US). COCHABAMBA: Antahuacana, *Buchtien* 2502 (MO, US). LA PAZ: Tipuani, Hacienda Casana, *Buchtien* 7120 (MO, NY, US); between Coroico and Caranavi, *Davidson* 4788 (MO); Polo-Polo bei Coroico, *Buchtien s.n.* (MO, SI, US-711096), 264 (F); San Carlos, *Buchtien* 3 (US); Mapiri, *Buchtien* 1172, 1173 (US). SANTA CRUZ: Buena Vista, *Steinbach* 5130 (F, NY, US), 6855 (F, MO, US); Montero a Puerto Grether, *Renvoize & Cope* 3962 (MO). BRAZIL. ACRE: track from km 20, road Cruzeiro do Sul to Japiim, *Prance et al.* 2879 (MO). AMAPA: Rio Araguaí, *Pires et al.* 51262 (NY, US); Rio Oiapoque, *Irwin et al.* 48146 (RB, US), 48150 (NY); Riozinho, 122 km NW of Porto Grande, *Mori & Souza* 17604 (US). AMAZONAS: Cucuhí, Rio Negro, *Baldwin* 3252 (US); Esperança, *Pires & Black* 855 (US); east bank of Rio Madeira, 1 km N of Humaitá, *Prance et al.* 3524 (MO, US); vicinity of Tototóví, *Prance et al.* 10223 (MO, NY, US), 10282 (R, US); Rio Solimões, Rio Juruá, 10 km por encima de la boca, *Prance et al.* 24494 (MO); Içana River, *Fróes* 28028 (US); basin of the upper Juruá, *Fróes* 45 (US). BAHIA: 22 km de la rodovia Ilheus-Itabuna, *Mori* 12844 (MO); ramal a esquerda no km 13 da rodovia Valência-Guaibím, *Carvalho & Lewis* 1130 (CEPEC, MO); próximo ponte sobre Rio Mucuri, na rodovia BR-101, *Mori et al.* 10537 (CEPEC, MO, RB); km 22 da antiga rod. Camacã/Itaimbé, *Hage & Mattos Silva* 304 (CEPEC); Mun. Ilheus, área do CEPEC, *Hage & Brito* 1395 (CEPEC), *Santos* 3399, 3787 (CEPEC). ESPÍRITO SANTO: Santa Bárbara do Caparão, *Mexia* 4099 (NY, US). GOIÁS: Serra do Caiapó, 42 km south of Caiapônia, *Prance & Silva* 59692 (F, MO, US). MARANHÃO: Rio Alto Turiaçu, Nueva Esperança, *Jangoux y Bahia* 252 (RB), 266 (MO, NY). MATO GROSSO: Serra do Roncador, 55 km N de Barra do Garças, *Prance & Silva* 59442 (MO, NY). MATO GROSSO DO SUL: Dourados, Colônia Agrícola Federal, *Swallen* 9410 (US). PARÁ: Varadouro de Periquito a Pimental, Tapajó, *Kuhlmann* 1915 (RB, US); Rio San Manuel, entre Igarapé Prata a Igarapé Preto, *Pires* 3810 (US); Ingatubinha, *Black* 47-2116 (US); estrada da Cachoeira Porteira, km 72, *Cid et al. s.n.*, 1 July 1980 (MO); Belém, *Pires & Black* 599 (US), *Archer* 8103 (F, US), *Silva* 24 (F); Moju River, Rubber Estate Fábrica, *Goeldi* 18 (F, US); Boa Vista, Rio Tapajós, *Swallen* 3198 (R, RB, US). PARANÁ: Garuvá, *Hatschbach* 3453 (BAA, SI); Ilha dos Bandeirantes, Rio Paraná, *Lindeman & Haas* 4368 (US). RIO DE JANEIRO: Serra do Andaraí, *Rosa* 95 (R); Parque Nacional da Tijuca, Serra dos Pretos Forros, *Martinelli* 3118 (R); Cachoeira de Macau-Nova Friburgo, *Sucre & Soderstrom* 9061 (R). RIO GRANDE DO SUL: Finca Peixoto, *Malme* 1332 (GH); São Leopoldo, *Dutra s.n.* (US-1388850); Esteio, pr. Porto Alegre, *Rambo* 38269 (US). RORAIMA: vicinity of Aguaris,



*Prance et al.* 9651 (F, US); Rio Jarani, *Pires et al.* 14420 (US); between Maitá and Paramiterí Indian village, *Prance et al.* 10560 (US). SANTA CATARINA: Mato São Pedro, *Klein* 11770 (US); Braço Joaquim, Luis Alves, *Reitz & Klein* 2062 (US). SÃO PAULO: Cainua, *Brade* 7818 (R); Morro das Pedras, *Brade* 7846 (R), 9167 (R); Ubatuba, *Costa s.n.* (US-1761194). COLOMBIA. AMAZONAS: Puerto Nariño and vicinity, along lower Río Loretoyacu, *Zarucchi* 1067 (COL); Fleuve Amazona, 5 km en amont de Leticia, *Sastre & Gómez-Pompa* 538 (COL); Monkey Island, a few miles up river from Leticia on the Amazon, *Gillett* 16529 (COL, US); edge of Río Agua Branca about 80 km W of Leticia, Trapecio, *Schultes & Black* 46-337 (US). ANTIOQUIA: 15 km W of Chiborodó, *Feddema* 1968 (NY, US). CHOCÓ: bank of Río San Juan, near Andagoya, *Killip* 35389 (COL); Hoya del Río San Juan, Quebrada Cunperro, abajo de Noanamá, *Forero et al.* 4860 (COL); hoya del Río San Juan, arriba de Palestina, *Forero et al.* 4169 (COL, MO); Muquí, alto de Buey, *Kjall von Sneidern a-26* (COL, MO); Unguía, *Forero et al.* 1988 (COL, MO); hoya del Río San Juan, Quebrada La Sierpe, *Forero et al.* 3973 (MO). MAGDALENA: Santa Marta, *H. H. Smith* 2126 (MO, NY). META: about 20 km SE of Villavicencio, *Killip* 34256 (COL, F, US); reserva de La Macarena, margen izquierda del Río Duida, 20 km de su desembocadura, *Pinto et al.* 727, 773 (COL); serranía de La Macarena, orilla del Río Sansa, *Fernandez Perez & Jaramillo* 5017 (COL); San Pedro de Arimena, *Haught* 2820 (COL, US); boca del Caño Cabra, *Pinto & Sastre* 1000 (COL). VALLE DEL CAUCA: Río Calima, región del Chocó, entre Pailón y El Coco, *Cuatrecasas* 21251 (F, US); Río Calima, entre La Herradura de Ordoñez y Peña de Campo Triste, *Cuatrecasas* 16673 (F, US). VAUPÉS: Río Vaupés, above raudal Yuruparí, *Schultes & Cabrera* 18723 (GH, US); Caño Curuyarí, afluente izquierdo del Vaupés, selva y matorral en Zurubi, *Cuatrecasas* 7215 (COL). COSTA RICA. GUANACASTE: NW of Lago Arenal, *Croat* 423 (MO). LIMÓN: 10 km por ruta al S de Cahuita, *Pohl & Pinette* 13188 (F); La Bomba, *Pohl & Davidse* 11105 (F). PUNTARENAS: Golfo Dulce Area, vicinity of Esquinas Experimental Station, *Allen* 5299 (F, MO, US); 5 km SE of Rincón, Osa Península, *Pohl & Davidse* 10711 (F, MO, US). SAN JOSÉ: Basin of El General, *Skutch* 4816 (US). ECUADOR. GUAYAS: Tengué, S of Guayaquil, *T. Holmgren* 86 (US). LOS RIOS: Río Palenque Biological Station, km 56 Quevedo-Santo Domingo, *Dodson* 5817 (US). NAPO PASTAZA: between Tena and Arquidona, *Asplund* 9171 (R, US); Tena, *Asplund* 10306 (NY, US). PICHINCHA: entre Santo Domingo y Quinindé, *Acosta Solís* 13926 (US); 20 km W of Santo Domingo de Los Colorados, *Cazalet* 5140 (NY, US). TUNGURAHUA: valley of Río Pastaza, La Victoria, *Asplund* 10058 (US). GUATEMALA. ALTA VERAPAZ: Río Santa Isabel, *Steyermark* 45867 (F, US). PETÉN: Tikal National Park, Tikal, *Lundell* 16484 (US). SUCHITEPEQUEZ: near Piquizate, *Steyermark* 47695 (F, US). GUYANA: Yarikita, *Hitchcock* 17590 (F, US); lower Saramacca River, *Maguire* 23741 (F, GH, NY, RB); between Gamura and Amatuk, Potaro River, *Maguire* 23008 (GH, NY); Kaie-teur Plateau, *Cowan & Soderstrom* 2026 (NY, US), 2120 (US); Tumatumari, *Gleason* 290 (GH, NY, US); vicinity of Tumatumari, Potaro River, *Hitchcock* 17410 (US); Amacura River, *de la Cruz* 3478 (GH, NY, US); Pomeroon River, *de la Cruz* 3220 (F, GH, US), 3166 (GH, NY, US); Kanuku mountains, in drainage of Takutu

River, *A. C. Smith* 3349 (GH, NY, US), 3423 (US); Barima River, *Jenmann* 7115 (US), *Archer* 2513 (US); vicinity of Issorora on Aruka River, *Hitchcock* 17568 (MO, US); Mazaruni Station, *Archer* 2431 (NY, US), *Tutin* 139 (GH, US). FRENCH GUIANA: Compté River, *Mori* 8932 (NY); Maripasoula, *Hooch* 132 (US); Haut Itany, *Hooch* 111 (US). HONDURAS. ATLÁNTIDA: Lance-tilla, 10 km al SW de Tela, *Nelson* 5205 (MO); vicinity of Tela, *Standley* 55116 (US). GRACIAS A DIOS: alrededores del Río Plátano, *Clewell* 4019 (MO). MEXICO. CHIA-PAS: Libertad, *Matuda* 18138 (F, US); Escuintla, *Matuda* 332 (US). OAXACA: El Palmar, Zongolica, *Vera Santos* 2639 (NY); Ubero, *Williams* 9483 (F, US). VERACRUZ: Zacuapán, *Purpus* 8070 (F, NY, US). NICARAGUA. ZELAYA: Guamil, *Molina* 2225 (F), 2266, 2347 (F, US). PANAMA. BOCAS DEL TORO: Chiriquito, 5 mi. S of Guarumo River, *Dwyer* 2108 (MO); cercanías de la Laguna Chiriquí, *von Weddell* 2575 (GH, MO). CHIRIQUÍ: near Puerto Armuellos, *Woodson Jr.* 858 (MO). COLÓN: Trinidad basin, near Cirrí River, *Pittier* 4027 (NY, US). DARIÉN: vicinity of Paya, Río Paya, *Stearn et al.* 440 (MO); vicinity of Campamento Buenavista, Río Chucunaque above confluence with Río Tuquesa, *Stearn et al.* 827 (MO, US), 957 (MO). PANAMÁ: east of the Río Tecumen, *Standley* 26682 (US). PARAGUAY: entre el Río Apa y el Río Aquidabán, *Fiebrig* 4706 (F); near Tobatí, *Archer* 4843 (US); Alto Paraguay, Primavera, *Woolston G.* 96 (SI); Curupaytí, Humaitá, *Bernardi* 18476 (MO); Villarica, *Jørgensen* 3540 (MO, US). Without locality, *Weddell* 3152 (F, NY). PERU. AMAZONAS: left bank of Río Marañón, above Cascadas de Mayasi, *Wurdack* 1976 (NY, US). HUANUCO: Tingo María, *Asplund* 13210 (NY, US), *Allard* 21662 (US); 6 km S of Tingo María, *Seibert* 2258 (MO, US), *Storp* 9479 (F). JUNÍN: Colonia Perené, *Hitchcock* 22058 (US); Chanchamayo Valley, *Schuncke* 129 (F, US); bajo Río Nanay, *Williams* 189 (F); above Pongo de Manseriche, right bank of mouth of Río Santiago, *Mexia* 6151 (F, US); La Merced, Hacienda Schuncke, *McBride* 5646 (F, US). LORETO: Río Hueppi, *Gentry et al.* 21852 (MO); Río Itaya, *Diaz et al.* 653 (MO); Caño Iricahua, abajo de Jenaro Herrera, *Encarnación* 25080, 25087 (US); Caño Supai, *Encarnación* 25056 (US); lower Río Nanay, *Williams* 589 (US). SAN MARTÍN: Quebrada de Almendras, *Schunke Vigo* 4461 (F, US); Tarapoto, *Williams* 5554 (F); Juan Juí, *Klug* 3813 (F, GH, MO, US); San Roque, *Williams* 7521 (F, US). SURINAM: Kayselberg airstrip, *Cramer* 2980 (NY); Oelemari, *Wessels Boer* 926 (GH); opposite Gansee, *van Doselaar* 1325 (US). Without locality, *Weigelt s.n.* (US-1720223). TRINIDAD: Ortoire River, *Britton et al.* 2539 (NY, US); Port of Spain, Saddle Road, *Tutin s.n.* (US-2954418); 3 mi. W of Tabaquite, *Soderstrom* 1074 (US); El Tucuche Mountain, *Soderstrom* 1048 (US). VENEZUELA. T. F. AMAZONAS: Isla Sebastián, Río Casiquiare, *Liesner & Clark* 8945 (MO); Sierra Parima, *Steyermark* 107022 (MO, NY), *Cardona* 1346, 1478 (US); 5 km E of San Fernando de Atabapo, *Davidse et al.* 17164 (MO). BARINAS: Reserva Forestal de Ticoporo, *Aristeguieta* 7005 (MO), *Breteler* 3710 (NY). BOLÍVAR: Guayapo, Bajo Caura, *Williams* 11999 (F, US); Río Paragua, between Guaiquinima and Río Torono, *Killip* 37425 (NY, US), 37527 (US), 37480 (NY, US); Caño Pablo, *Liesner & Morillo* 13943 (MO); El Dorado, *Curet* 213 (US); Salto de Chalimano en el Río Paramichi, *Steyermark* 90706 (US); selva al lado del Río Nichare, *Steyermark* 95673 (MO, NY, US). DELTA



AMACURA: 33 km al E de El Palmar, *Steyermark* 93096 (US); a lo largo del Caño Aragua, *Steyermark et al.* 114792 (MO); 73 km al SE de Piacoa, *Davidse & González* 16466 (MO). LARA: near Barquimiset, *Saer* 284 (NY, US). MIRANDA: along Río Grande del Tuy, above Paparo, *Pittier* 6328 (US). MONAGAS: 1.5 km N of La Hormiga, *Wurdack & Monachino* 39527 (RB, NY, US); 2 km N of Santa Inés, *Pursell et al.* 9167 (US). SUCRE: Península de Paria, entre Los Pocitos de Santa Isabel y Roma, *Dumond et al.* 7659 (NY). ZULIA: 3 km E of Río de Oro, *Davidse et al.* 18784 (MO); alrededores de Casigua El Cubo, *Bunting* 7815 (MO); intersección del Río Catatumbo y la ruta entre Maracaibo y La Fría, *Davidse et al.* 18838 (MO); Quebrada Tayaya, *Davidse et al.* 18493 (MO).

Hitchcock & Chase (1910, 1915) distinguished *P. stoloniferum* from *P. frondescens* by the sizes of the plants and the panicles and by the length of the upper glume compared with the lower lemma. Abundant material showed a complete gradation in these characters. Therefore, we are treating *P. frondescens* as a synonym of *P. stoloniferum*.

**13. *Panicum venezuelae*** Hackel, Oesterr. Bot. Z. 51: 368. 1901. *Brachiaria venezuelae* (Hackel) Henrard, Blumea 3: 435. 1940. TYPE: Venezuela. Without locality: *Eggers* 13471 (holotype, W, not seen, fragment at US). Figure 15.

*P. ineptum* A. Hitchc. & Chase, Contr. U.S. Natl. Herb. 17: 509. 1915.

*P. berteronianum* Mez, Bot. Jahrb. Syst. 56, Beibl. 125: 5. 1921. Not *P. berteronianum* Schultes, 1854. TYPE: Venezuela. Federal District: La Guayra, *Zollner s.n.* (holotype, B, not seen, fragment at US).

Stoloniferous, densely and freely branching perennials, with very long, slender, prostrate stolons. Culms decumbent to ascending, densely branching mostly at the lower nodes, 40–80 cm tall; internodes 3–8 cm long, cylindric to compressed, hollow, sparsely pilose to glabrous; nodes densely pilose, with long whitish, usually retrorse hairs. Leaf sheaths 1–4 cm long, usually shorter than the internodes, stramineous, striate, sparsely to densely pilose with long, whitish hairs, the margins ciliate. Ligule membranous-ciliate, ca. 0.5 mm long, with long hairs toward the back at the base of the blade; collar stramineous, pilose. Leaf blades ovate-lanceolate to lanceolate, acuminate, flat, 3–9 cm long, 0.5–1 cm

wide, cordate basally, densely to sparsely hirsute; the margins long-ciliate toward the base, otherwise ciliate to scabrous, cartilaginous; midnerve inconspicuous; pseudopetiole short, ca. 0.2 cm long. Panicles lax, long-exserted, 2–11 cm long, 1–3 cm wide, formed by 4–10 distant, alternate, short branches, these divergent from the axis and racemose, with cleistogamous spikelets in pairs arranged along either side of a ventral septum; chasmogamous spikelets occasionally present; axis longitudinally ridged, long-hirsute, the axils of the branches densely pilose, axis of the branches triquetrous, densely hirsute; pedicels short. Axillary panicles similar to the terminal panicle, but short-exserted and few-flowered. Spikelets ellipsoid, 2.5–3 mm long, 1.1–1.3 mm wide, stramineous to greenish, the glumes and lower lemma sparsely to densely hirsute. Lower glume ovate, 1.5–1.7 mm long,  $\frac{1}{2}$  or more the length of the spikelet, 3-nerved, the midnerve scabrous. Upper glume 2.6–2.9 mm long, gibbous, 5(–7)-nerved, with thick, papillose hairs over the entire surface or only toward the apex, 2 glands occasionally present on the middle portion of the outer surface, the inner surface scabrous. Lower lemma larger than the upper glume, the apex  $\pm$  inflated, with a few thick hairs, the middle portion flattened and glabrous, the margins inrolled toward the apex, 5-nerved, the lateral nerves remote from the midnerve, 2 glands sometimes present on the middle portion of the outer surface. Lower palea elliptic to obovate, 1.6–1.8 mm long, 0.7 mm wide, hyaline, shortly pilose toward the upper margins, glabrous over the rest of the surface; male flower absent. Upper antheridium ellipsoid to obovoid, obtuse, 1.6–1.8 mm long, 0.8–1.1 mm wide, stramineous; lemma 5-nerved, strongly convex; anthers 3, those of the cleistogamous spikelets small, 0.2–0.3 mm long; anthers of the chasmogamous spikelets 0.9 mm long. Caryopsis 1.3 mm long, 1 mm wide; hilum punctiform. In flower all year.

*Distribution.* This species occurs in Guatemala, Honduras, Cuba, Haiti, the Dominican Republic, and Venezuela to northern



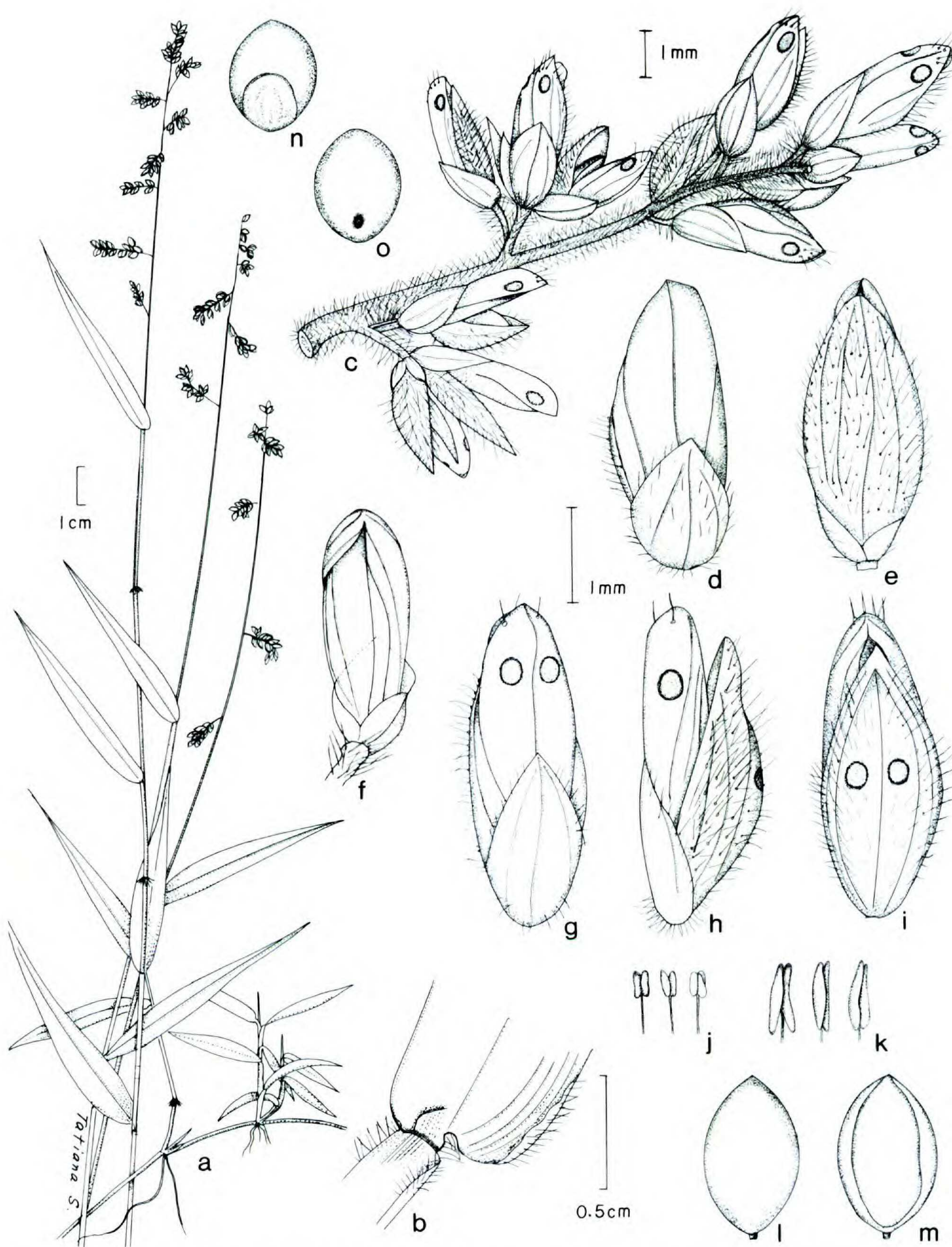


FIGURE 15. *Panicum venezuelae*.—a. Habit.—b. Ligule.—c. Racemose branch.—d. Spikelet, ventral view.—e. Spikelet, dorsal view.—f. Lower lemma.—g. Spikelet, ventral view, lower lemma with glands.—h. Spikelet, lateral view, upper glume and lower lemma with glands.—i. Spikelet, dorsal view, upper glume with glands.—j. Anthers of cleistogamous flower.—k. Anthers of chasmogamous flower.—l. Upper antheridium, dorsal view.—m. Upper antheridium, ventral view.—n. Caryopsis, embryo side.—o. Caryopsis, hilum side. Based on Pinto 307 (US).

Brazil in humid and shady places at 100–1,200 m elevation.

*Representative specimens examined.* BRAZIL. ALAGOAS: Tapera, *Pickel* s.n. (US-1645543), 2469 (US).

BAHIA: Alagoinhas, *Chase* 8135 (US); camino de Santa Inés a Rio Bahia, *Pinheiro* 7855 (MO); Espigão Mestre, 6 km S of Cocos, *Anderson et al.* 37036 (F, MO); Serra do Itiuba, 6 km E of Itiuba, *Harley et al.* 16203 (MO, US); Santa Terezinha, *Bondar* 2609 (SP, US); Paraguaçu-valley, Muritiba, *Pinto* 307 (US); Feira de Santana,



Chase 8066 (F, RB, US), 8070 (US); Cachoeira, vale dos rios Paraguaçu e Jacuípe, *Pedra do Cavalo* 475 (CEPEC); basin of the upper São Francisco River, just beyond Calderão, ca. 32 km NE from Bom Jesus de Lapa, *Harley* 21497 (CEPEC); rodovia Sta. Inés a Rio Bahia aos 10 km, *Pinheiro* 1855 (CEPEC, US). CEARÁ: Serra de Baturité, morro de Ceu, *Eugenio* 278 (RB). PARAÍBA: Moreno, *Pickel* 3848 (RB); Areia, *Coelho de Moraes* 850 (P). PERNAMBUCO: Garanhuns, *Chase* 7786, 7789 (F, US); Pesqueira, *Pickel* 1663 (US); Fazenda Recreio, Mun. de Rio Grande, *Faria* 2495 (RB). RIO GRANDE DO NORTE: Nova Cruz de Montanhas, *Swallen* 4813 (RB, US). CUBA. ORIENTE: Barbí, Loma del Gato, Sierra Maestra, *Ekman* 15661 (US); Loma del Gato, S of Loma San Juan, *Leon et al.* 10190 (US). GUATEMALA. GUATEMALA: near Fiscal, *Standley* 59580, 80411, 80463 (F, US), 80630 (F). HONDURAS. EL PARAÍSO: Quebrada de El Muro, between Las Mesas and Yuscarán, *Standley* 29263 (US); road to Yuscarán, *Swallen* 11329, 11333 (US). MORAZÁN: near El Jicarito, *Standley* 20874, 21640 (F), 27498 (US), *Swallen* 11377 (US); trail from La Quince, El Zamorano, *Standley* 14567, 21272 (US); campus of Escuela Agrícola El Zamorano, *Pohl & Davidse* 12458 (MO); 8 km S of La Venta by road, *Davidse & Pohl* 2155a (MO). SANTO DOMINGO. MONTE CRISTI: near Arroyo Seco, *Ekman* 12608, 13085 (US); Puerto Plata, Bajabonico, *Ekman* 14499 (US). SANTIAGO: San José de las Matas, *Ekman* 14602 (US), *Jiménez* 950 (US). VENEZUELA. DISTRITO FEDERAL: Colinas de Yaguará, *Tamayo* 1449 (F); Antimano, *Pittier* 12581 (US); entre Caracas y La Guayra, *Burkart* 17013 (SI). FALCÓN: Seranía de San Luis, Fila Las Playitas, *Ruiz* 2543 (MO). LARA: en cerros arriba del caserío Simara, *Burandt Jr.* v0192 (MO); Loma de León, *Iribarre*, *Tamayo* 3743 (MO); Hacienda Sosa, *Badillo s.n.* (US-1760677).

Henrard (1940) transferred *P. venezuelae* to *Brachiaria* without explanation. Previously, when describing *P. ineptum*, Hitchcock & Chase (1915) did not refer it to any of the groups of *Panicum*. Brown (1977) pointed out that this species, being a C<sub>3</sub> plant, is not actually a *Brachiaria*, since the genus *Brachiaria* is totally C<sub>4</sub> or Kranz. Sendulsky (1978), in her treatment of *Brachiaria* for Brazil, called attention to the size of the anthers and to the unusual form, for *Brachiaria*, of the long-winged lodicules. She suggested retention of this species in *Panicum*.

The panicle, habit, and spikelets (which bear glands on the lower lemma and occasionally on the upper glume also) suggest inclusion of *P. venezuelae* in sect. *Stolonifera*. However, this is the only species in the section with cleistogamous spikelets, a feature otherwise only found in *Panicum* in species of subg. *Dichanthelium* A. Hitchc. & Chase. Also, the glands differ from those in other

species of sect. *Stolonifera*; in *P. venezuelae* the glands are bigger and depressed, not crateriform.

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#### APPENDIX I

List of taxa and informal groups. Species listed in italics are accepted. Those listed in roman are not accepted.

*Brachiaria venezuelae* (Hackel) Henrard

*Dichanthelium*, subg.

*Eriochloa pulchella* (Raddi) Kunth

*Hymenachne leptostachya* (J. S. Presl) Fourn.

*Ichnanthus gardneri* Mez

*Latissima*, group

*Laxa*, sect.

*Lophatherum gracile* Brongn.

*Lorea*, sect.

*Megista*, sect.

*Molinia caerulea* (L.) Moench

*Monticola*, sect.

*Panicum* L.

*P. albospiculatum* Swallen

*P. andreanum* Mez

*P. apricum* Swallen

*P. bambusaefolium* Desv.

*P. berteronianum* Mez

*P. biglandulare* Scribner & Smith

*P. bipustulatum* Schldl.

*P. blepharophorum* Mez

*P. blepharophorum* J. S. Presl

*P. boliviense* Hackel

*P. brachyclados* Reichb.

*P. brachystachyum* Trin.

*P. bresolinii* L. B. Smith & Wassh.

*P. bulbosum* Kunth

*P. chapadense* Swallen

*P. crateriferum* Sohns

*P. ctenodes* Trin.

*P. ctenodes* var. *major* Trin.

*P. frondescens* G. Meyer

*P. ineptum* A. Hitchc.

*P. irregulare* Swallen

*P. kegelii* Steudel

*P. kleinii* Swallen

*P. latissimum* Mikan ex Trin.

*P. leprieurii* Steudel

*P. leptachne* Doell

*P. leptostachyum* J. S. Presl

*P. macrophyllum* Raddi

*P. olyraefolium* Raddi

*P. paucifolium* Swallen

*P. piauiense* Swallen

*P. pilosum* Swartz

*P. pirineosense* Swallen

*P. pompale* Swallen

*P. pulchellum* Raddi

*P. quadriglume* (Doell) Henrard

*P. rude* Nees

*P. secundum* Trin.

*P. secundum* var. *inaequiglume* Doell

*P. secundum* var. *subaequiglume* Doell

*P. semitectum* Swallen

*P. soderstromii* Zuloaga & Sendulsky

*P. stoloniferum* Poiret

*P. umbrosum* Salzm. ex Steudel

*P. venezuelae* Hackel

*Parvifolia*, sect.

*Parvigluma*, sect.

*Phanopyrum*, sect.

*Phanopyrum*, subg.

*Pseudechinolaena* Stapf

*Puelia ciliata* Franch

*Sarmentosa*, sect.

*Sarmentosum*, subg.

*Stolonifera*, group

*Stolonifera*, sect.

*Sucrea sampaiana* (A. Hitchc.) Soderstrom

*Verrucosa*, sect.